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Abstract

Presented is an assessment of the growth of scientific and technical manpower from 1950 through 1966. The Bureau of Labor Statistics prepared annual estimates of employed natural scientists and engineers which were related to influential economic and social developments. Data were gathered on the supply, training, employment, and other personal and professional characteristics of scientists and engineers. This was the first comprehensive historial employment series for scientists and engineers that included all sectors of the economy by each major scientific occupational group conducted. (RR)

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EMPLOYMENT of SCIENTISTS and ENGINEERS in the UNITED STATES

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National Science Foundation
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EMPLOYMENT of SCIENTISTS and ENGINEERS in the UNITED STATES, 1950-66

National Science
Foundation in
cooperation with
U.S. Department
of Labor, Bureau
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Foreword

The Nation's scientific and technical manpower resources are prime assets in achieving a high degree of social and cultural development, economic growth, technological advancement, and national security. Wherever employed—whether in industry, in universities and colleges, in government facilities, or in nonprofit organizations—scientific and engineering personnel have produced national and international impacts disproportionately greater than their numbers.

In continuing recognition of the vital role played by this manpower resource, the National Science Foundation has attempted to ensure a flow of data on the supply, training, employment, and other personal and professional characteristics of scientists and engineers to government, industry, educators, and the general public. One major gap in the development of employment data has been the lack of a series of comparable employment statistics for scientists and engineers in the entire Nation over any substantial period of time. Such information is vital to manpower analysis and manpower planning since these statistics provide benchmarks useful in making projections of future occupational requirements and thus influence decisions on educational planning.

This report presents the findings of an employment study undertaken by the Bureau of Labor Statistics in cooperation with, and with support of, the National Science Foundation. It encompasses, for the first time, a comprehensive historical employment series for scientists and engineers covering a 16-year period, 1950-66, and includes all sectors of the economy by each major scientific occupational group. It is hoped that this series can be continued on a current basis.

The preparation of this report resulted from the joint efforts of the Foundation's Office of Economic and Manpower Studies, H. E. Riley, Head, and the Bureau of Labor Statistics, Harold Goldstein, Associate Commissioner for Employment and Manpower Studies.

CHARLES E. FALK
Planning Director
National Science Foundation

SEPTEMBER 1968

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The study was carried out in the Division of Manpower and Occupational Outlook, Bureau of Labor Statistics, under the general supervision of Neal H. Rosenthal. Staff members who participated in the research, analysis of data, and preparation of the basic report were Elinor W. Abramson, Michael L. Crowley, Daniel E. Hecker, Annie Lefkowitz, and Melvin C. Fountain. Technical advice was provided by Michael D. Werthheimer, George A. Hermanson, and Arthur Jaffe, of the Bureau's Office of Data Collection and Survey Operations.

Within the National Science Foundation, Joel Barries, Associate Study Director, was responsible for the analysis of the statistical materials developed by the BLS and the preparation of the final report, under the general direction of Norman Seltzer, Study Director, Scientific Manpower Studies Group. Overall guidance was provided by Thomas J. Mills, Head, Sponsored Surveys and Studies Section.

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Highlights

- Employment of scientists and engineers in the United States rose from 550,800 in 1950 to 1,412,500 in 1966, or by 156 percent. In comparison, total employment increased by only 24 percent over the 16-year period.
- Scientific occupations increased more rapidly than engineering, growing by 185 percent from 146,300 to 416,800, whereas engineering increased by 146 percent from 404,600 to 996,000. Among the scientists, more than one-fourth were chemists in 1966. Medical scientists had the most rapid growth over the period, more than double the rate for all scientific occupations.
- Between 1950 and 1966, the number of scientists and engineers engaged in research and development rose by 242 percent. The proportion of R&D personnel grew steadily from 28 percent of all scientists and engineers in 1950 to 37 percent in 1966.
- Private industry was the largest employer of scientists and engineers, with 71 percent of the total in 1966. Governments—Federal, State, and local—employed almost 16 percent; universities and colleges, nearly 13 percent; and nonprofit institutions, about 1 percent.
- Employment of scientists and engineers increased most rapidly in the nonprofit sector, rising by 359 percent between 1950 and 1966. Government employment (excluding that of public educational institutions) showed the lowest growth—106 percent.

Introduction

A consistent historical series on employment of scientists and engineers in various sectors of the economy has long been needed in order to assess the growth of manpower in scientific and technical areas and the factors underlying this growth. Statistics on employment of scientists and engineers in various sectors of the economy have been collected over the years by different agencies and organizations. The definitions, methodologies, survey coverage, and purposes for collecting data among these organizations, however, have frequently differed. Furthermore, continued improvements in survey coverage and techniques have sometimes created problems of comparability in the historical data that have been collected. There are also some major gaps in the data for specific years and for some important segments of the economy.

The National Science Foundation requested the Bureau of Labor Statistics, U.S. Department of Labor, to undertake the task of assembling the relevant data and constructing a consistent statistical series on the numbers of scientists and engineers employed in the United States.[1]

This report presents the annual estimates of employed natural scientists and engineers for 1950 through 1966, as prepared by the Bureau of Labor Statistics,[2] and relates them to major economic and social developments found by the National Science Foundation to be important factors underlying the trends shown by these statistics.

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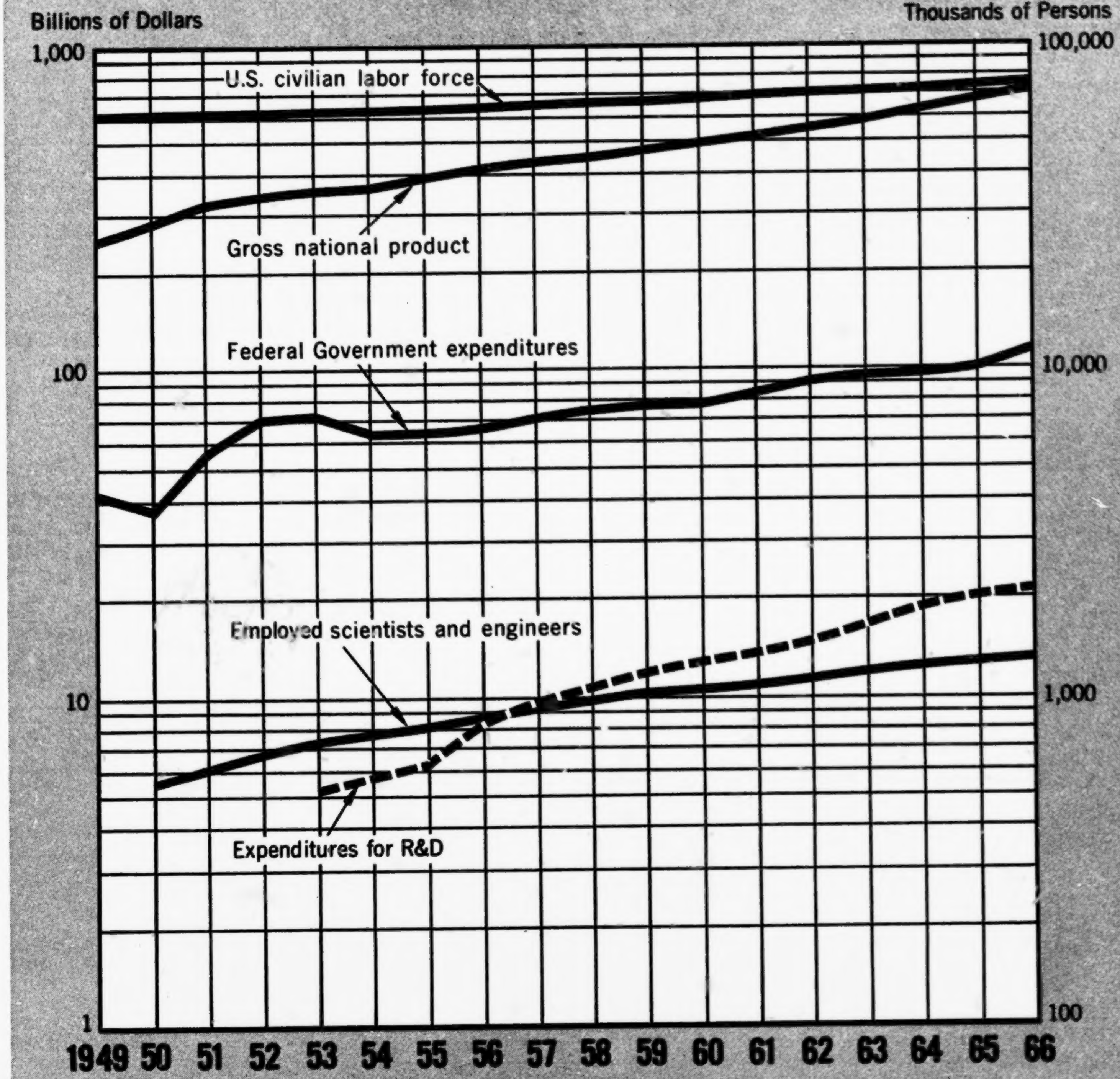
[1] Excludes social scientists. See appendices B and C for definitions of scientists and engineers included in this study.

[2] It should be kept in mind in using these estimates that a considerable amount of judgment was exercised in their development. See appendix B.

Chart 1.

Economic indicators affecting science and engineering employment, 1949-66



Note: Dollar amounts -- current dollars for calendar years.
Labor force -- annual average.
Employed scientists and engineers -- as of January.

Sources: U.S. Department of Labor, Bureau of Labor Statistics;
Council of Economic Advisers; and National Science Foundation.

Factors Affecting Employment

The period 1950-66 witnessed an unprecedented growth in the Nation's manpower engaged in science and engineering activities. New and expanded programs in research and development, defense, space exploration, atomic energy, health, and higher education all contributed to this growth.

Early in the period the Korean conflict led to a new military buildup featuring the development and procurement of technologically sophisticated weapons and other military equipment. The exigencies of world tensions after the Korean armistice sustained the emphasis on military research and development. Competition for sales in a rapidly expanding civilian market stimulated greater expenditures for research and development as industry sought new products and more efficient methods of production. Government expenditures on development of space hardware and exploration, the commercial communications satellite, the SST aircraft, electronic guidance and control systems, and new atomic reactors also grew apace during this period.

The staffing of these programs could be accomplished only in part from the supply of fully qualified professional manpower. The use of new college graduates and the upgrading of technicians and transfers from closely related occupations were also required. After the low point in the college-age population early in the period, increasing college enrollments each year set new records. Degrees awarded in science and engineering followed these trends, although the share for baccalaureates in engineering decreased after the early 1950's. Graduate training, increasingly the symbol of full professional status in science, strained the resources of the universities and, by creating the need for increases in faculties in the sciences, placed new demands on manpower resources. Federal Government programs provided substantial funds to higher education, but even this allocation of resources failed to develop sufficient fully qualified manpower to meet all requirements. Private industry particularly had to meet shortages by training and upgrading nonprofessional personnel, by separating jobs into simpler components, and by other methods learned during World War II.

By the end of the 16-year period the growth rate of R&D expenditures had slowed, and growing enrollments in the graduate schools provided the base for the larger number of advanced degree holders. As a result a better balance between manpower resources and requirements appeared in prospect.

In considering the growth in the utilization of science and engineering manpower in the United States, this increase should be reviewed against some pertinent background information, including overall growth of the economy, the role of the Federal Government, and expenditures for scientific research and development. In addition, an analysis of trend data on population, labor force, and employment provides a framework within which the growth of science and engineering manpower may be better understood.

Trends in Gross National Product

Gross national product, the commonly used broad indicator of economic growth, showed an increase from $256.5 billion to $683.9 billion at current prices in the total volume of goods and services produced in the United States over the 1949-65 period.[3] This represents an increase of 167 percent, for an annual growth rate of about 6.3 percent[4] and includes the effects of higher prices as well as economic growth. (After adjustment for changes in price levels, the GNP increase amounted to 90 percent.)

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[3] Since data for the time series on employment of scientists and engineers is as of January of each year, and gross national product is based on the calendar year, the previous year's GNP is selected as the appropriate measure corresponding with employment in January of the given year.

[4] In this report, phrases such as average increase, average annual increase, annual growth, and similar terminology are used synonymously to describe estimated annual compound rate of change between the first and last year of the time period discussed.

Federal Government Expenditures

The trend of Federal Government expenditures (administrative budget) shows similarly a sharp increase from $41.1 billion in calendar year 1949 to $101.4 billion in 1965, an increase of 147 percent over the period.[5] (See chart 1.)

The Federal Government is by far the largest single employer of scientists and engineers. The Department of Labor has estimated that as many as two-fifths of the Nation's scientists and engineers are engaged either directly or indirectly in work for the Federal Government. It is apparent that Federal programs and expenditures have had a definite impact on such employment.

R&D Expenditures

Expenditures for research and development increased at an average annual rate of 12.1 percent from 1953 (first year for this series) to 1965, and reached $20.5 billion in the latter year.

Because of the relatively low starting point—$5.2 billion in R&D expenditures in 1953—the calculated average annual rate of growth was higher in the early part of the period—15.8 percent annually during 1953-58 and 9.5 percent during 1958-65. During the latter period, however, expenditures rose from almost $10.9 billion to about $20.5 billion.

The Federal Government has provided the bulk of support for scientific research and development performed in all sectors of the economy. Federal R&D funds rose each year of the period, from $2.8 billion in fiscal year 1953, or about 53 percent of the total, to $14.1 billion in 1966, or about 63 percent of the total. As already noted, this sharp growth began in the early 1950's with the advent of the Korean war and was augmented later by the expansion of space- and health-related programs and by the continuance of international tensions. However, the annual growth rate of Federal funds for research and development increased rapidly in the period 1953-58 at an average 19.7 percent annually, then slowed between 1958 and 1966 to a 9.6 percent average annual rate. The 1-year increase between fiscal years 1965 and 1966 was 7.7 percent.

Private industry was the principal performer of research and development, expending $3.6 billion in calendar year 1953 and $14.2 billion in 1965, but slightly decreasing its share of total expendi-

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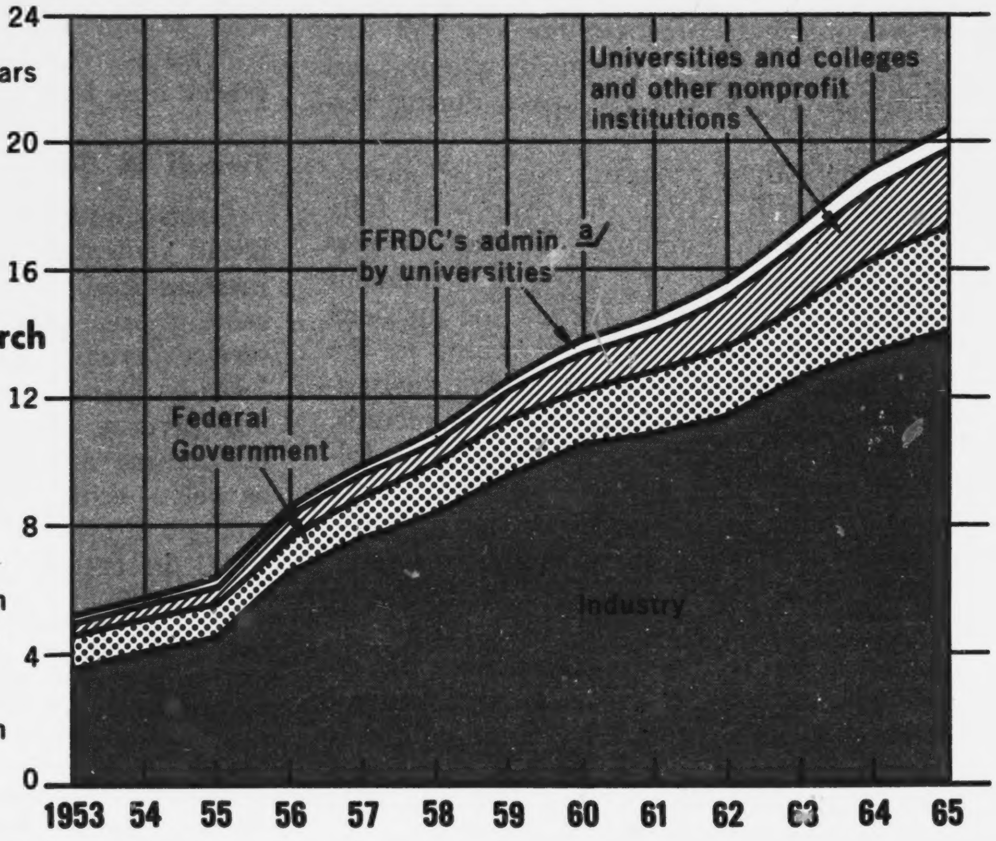
[5] U.S. President, *Economic Report of the President.* Transmitted to the Congress January 1967. (Washington, D.C. 20402: Supt. of Documents, U.S. Government Printing Office). Here and elsewhere in the report, percent changes are calculated from source data and therefore may differ slightly from the sometimes further-rounded data shown.

Chart 2. Expenditures for performance of research and development, by sector, 1953-65



a/ Federally Funded Research and Development Centers

Source:
National Science Foundation

TABLE 1.—POPULATION OF THE UNITED STATES, BY AGE, 1950–66

(In millions)

Year	Total number	Under 20 years	20 to 24 years	25 to 44 years	45 to 64 years	65 and over
1950	152.3	51.7	11.7	45.7	30.8	12.4
1951	154.9	53.1	11.6	46.1	31.4	12.8
1952	157.6	54.6	11.4	46.5	31.9	13.2
1953	160.2	56.3	11.1	46.8	32.4	13.6
1954	163.0	58.2	10.8	47.0	32.9	14.1
1955	165.9	60.0	10.7	47.2	33.5	14.5
1956	168.9	61.9	10.6	47.4	34.1	14.9
1957	172.0	64.0	10.6	47.4	34.6	15.4
1958	174.9	65.9	10.8	47.3	35.1	15.8
1959	177.8	67.8	11.0	47.2	35.7	16.2
1960	180.7	69.6	11.1	47.1	36.2	16.7
1961	183.8	71.5	11.4	47.1	36.8	17.0
1962	186.7	73.2	11.9	47.0	37.3	17.3
1963	189.4	74.4	12.6	46.9	37.9	17.6
1964	192.1	75.8	13.2	46.9	38.4	17.9
1965	194.6	77.0	13.7	46.8	39.0	18.2
1966	196.8	78.0	14.0	46.8	39.6	18.5

Note: Details may not add to totals because of rounding.
Source: U.S. President, *Economic Report of the President*. Transmitted to the Congress January 1967. Washington, D.C. 20402: Supt. of Documents, U.S. Government Printing Office.

tures from 69.7 percent to 68.7 percent. (See chart 2.)

During this period, industry's performance of research and development rose at a more rapid rate during 1953-59 (18.2 percent per year) than during 1958-65 (7.8 percent annually). Even though the reverse was true for Federal agencies, universities and colleges, and their associated Federally Funded Research and Development Centers, the slowing industry growth rate was enough to retard the overall growth rate in the later period. This reduction in the industry growth rate resulted from the decline in the growth of Federal R&D funds, of which the industry sector is the primary recipient.[6]

Expenditures for research and development in relation to the gross national product serve as one measure of the allocation of the Nation's resources to the advancement of science and technology. This indicator shows a steady rise over the period in the proportion of R&D expenditures to total GNP. While R&D expenditures increased almost fourfold between 1953 and 1965, as a portion of the GNP (both in current prices) they more than doubled, from 1.4 percent to 3.0 percent. It should be noted, however, that GNP moved upward by 7.8 percent from 1964 to 1965, while R&D expenditures showed only a 6.7-percent increase. This was the first recent year in which the percent increase in R&D expenditures was smaller than the growth of the entire economy.

Population and Labor Force

The growth of scientific and engineering manpower occurs within a broad framework of population and labor force, and its progress can be gauged in relation to these overall indicators and to employment of other major occupational groups.

The total population of the Nation rose from 152 million in 1950 to 197 million in 1966 (table 1). The notable increase with implications for scientific and engineering manpower was the additional 2.4 million persons in the 20–24-year age group from which come most of the new college graduates entering the labor force. During this period, the number of persons in this age group increased by over 20 percent, from less than 11.7 million in 1950 to more than 14.0 million in 1966, whereas in the preceding 16-year period this group had increased less than 4 percent, from 11.2 million in 1934 to 11.7 million by 1950. Labor force growth during the period 1950-66 was substantial, increasing by 22 percent from 62.2 million to 75.8 million. (See chart 3.)

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[6] For a detailed analysis of R&D expenditures through 1968, see National Science Foundation, *National Patterns of R&D Resources: Funds and Manpower in the United States, 1953–68*, NSF 67–7. Washington, D.C. 20402: Supt. of Documents, U.S. Government Printing Office, 1967.

The growth of scientists and engineers is significant in relation to the employment levels of other major occupational groups. The data in this report on other occupational groups, while not strictly comparable to the time series on scientists and engineers because of differences in methods of data collection and estimation, can serve to bring out differences in trends.

During the 16 years between 1950 and 1966, total employment rose by 24 percent while the

TABLE 2.—EMPLOYED PERSONS 14 YEARS OLD AND OVER, BY MAJOR OCCUPATIONAL GROUP, 1950–66

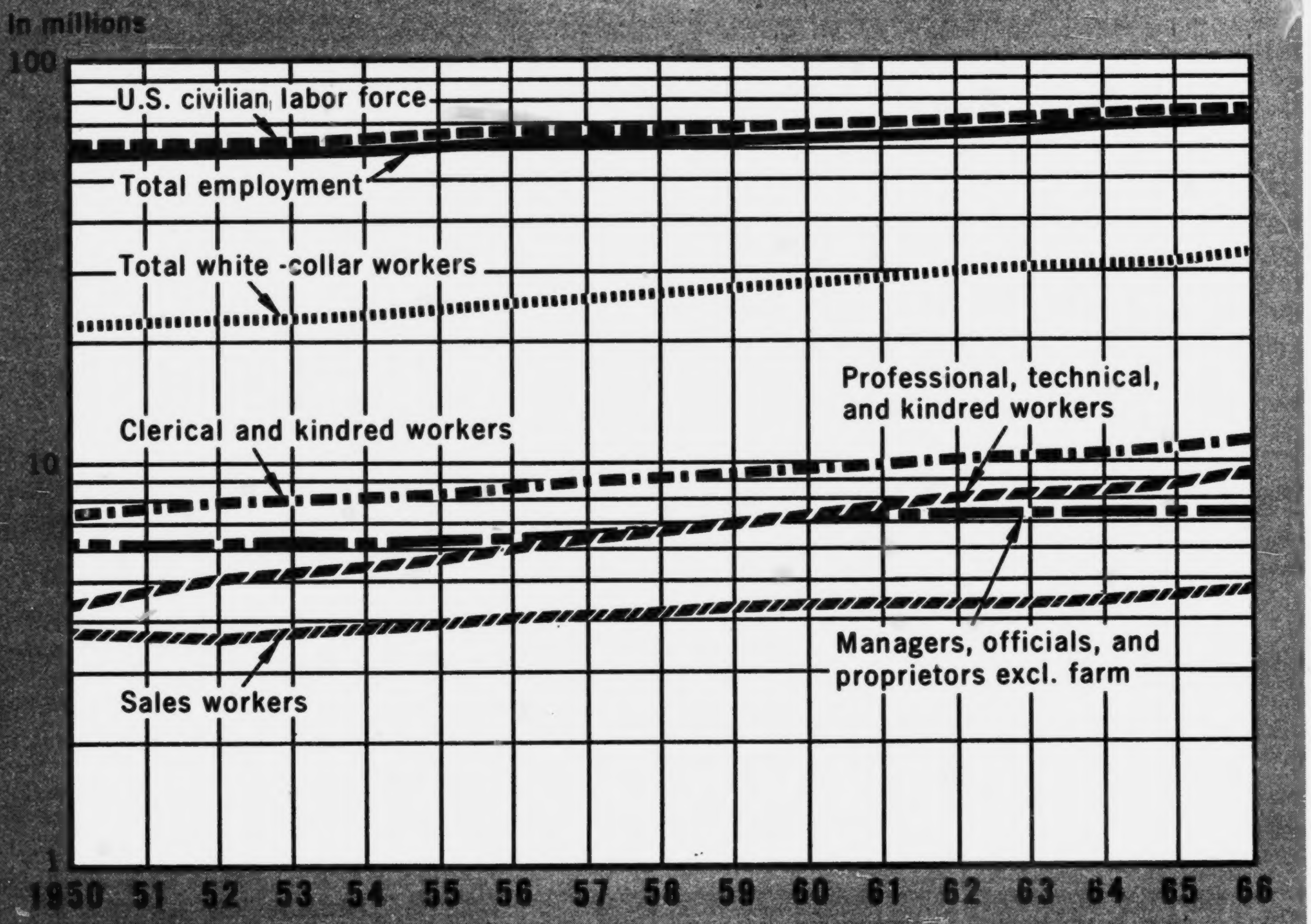
Year	Total employed	White-collar workers					Blue collar workers	Service workers	Farm workers
		Total	Professional, technical, and kindred	Managers[a]	Clerical and kindred	Sales			
				Number in millions					
1950	59.6	22.3	4.5	6.4	7.6	3.8	23.3	6.5	7.4
1951	60.9	22.4	4.8	6.2	7.7	3.8	25.0	6.5	6.9
1952	61.0	23.1	5.1	6.2	8.1	3.7	24.8	6.5	6.6
1953	61.8	23.6	5.4	6.4	8.0	3.8	25.0	6.9	6.2
1954	61.2	23.9	5.6	6.2	8.2	3.9	24.2	6.8	6.3
1955	63.0	24.6	5.8	6.4	8.4	4.0	24.7	7.1	6.6
1956	64.9	25.6	6.1	6.6	8.8	4.1	25.2	7.6	6.5
1957	65.0	26.5	6.5	6.7	9.2	4.1	24.9	7.6	6.1
1958	64.0	27.1	7.0	6.8	9.1	4.2	23.5	7.8	5.6
1959	65.6	27.8	7.1	6.9	9.3	4.4	24.2	8.0	5.6
1960	66.7	28.7	7.5	7.1	9.8	4.4	24.2	8.3	5.4
1961	66.8	29.1	7.7	7.1	9.9	4.4	23.9	8.6	5.1
1962	67.8	29.9	8.0	7.4	10.1	4.3	24.3	8.8	4.9
1963	68.8	30.2	8.3	7.3	10.3	4.4	25.0	9.0	4.6
1964	70.4	31.1	8.6	7.5	10.7	4.5	25.5	9.3	4.4
1965	72.2	32.1	8.9	7.3	11.2	4.7	26.5	9.3	4.3
1966	74.1	33.3	9.3	7.4	11.8	4.8	27.2	9.7	3.9
				Percent					
1950	100.0	37.5	7.5	10.8	12.8	6.4	39.1	11.0	12.5
1951	100.0	36.8	7.9	10.2	12.6	6.2	41.1	10.8	11.3
1952	100.0	37.7	8.3	10.1	13.3	6.0	40.7	10.7	10.9
1953	100.0	38.2	8.8	10.4	12.9	6.1	40.4	11.3	10.1
1954	100.0	39.0	9.1	10.1	13.4	6.4	39.5	11.1	10.4
1955	100.0	39.0	9.2	10.2	13.3	6.3	39.3	11.3	10.5
1956	100.0	39.4	9.4	10.1	13.6	6.3	38.8	11.7	10.1
1957	100.0	40.6	9.9	10.3	14.1	6.3	38.3	11.7	9.3
1958	100.0	42.3	10.9	10.6	14.3	6.5	36.7	12.2	8.7
1959	100.0	42.4	10.9	10.6	14.2	6.7	36.9	12.2	8.5
1960	100.0	43.1	11.2	10.6	14.7	6.6	36.3	12.5	8.1
1961	100.0	43.6	11.5	10.7	14.8	6.6	35.7	12.9	7.8
1962	100.0	44.1	11.9	10.9	14.9	6.4	35.8	13.0	7.2
1963	100.0	43.9	12.0	10.6	14.9	6.3	36.3	13.1	6.7
1964	100.0	44.2	12.2	10.6	15.2	6.3	36.3	13.2	6.3
1965	100.0	44.5	12.3	10.2	15.5	6.5	36.7	12.9	5.9
1966	100.0	45.0	12.6	10.0	16.0	6.4	36.7	13.1	5.2

[a] Managers, officials, and proprietors, excluding farm.

Note: Details may not add to totals because of rounding.

Source: U. S. President, *Manpower Report of the President* and *A Report on Manpower Requirements, Resources, Utilization, and Training,* by the U.S. Department of Labor. Transmitted to Congress, April 1967. Washington, D.C. 20402: Supt. of Documents, U.S. Government Printing Office.

Chart 3.
Employment of white collar workers, by major occupational group, 1950-66



Source: U.S. Department of Labor and table 2.

white-collar group[7] increased by almost 50 percent, rising from an employment level of 22 million to 33 million for the greatest numerical as well as relative increase of the broad occupational groups. (See table 2.)

Within the white-collar division the professional, technical, and kindred workers were the fastest growing group in both numbers and rate of growth, increasing by 108 percent from 4.5 million in 1950 to 9.3 million in 1966. (See chart 3.)

In 1950 the professional, technical, and kindred workers were 20 percent of the white-collar group and 8 percent of total employment; by 1966 they were 28 percent of the white-collar workers and 13 percent of total employment.

These changes in the occupational structure reflect, among other factors, a shift toward the services-related rather than goods-related occupations, the growing industrial mechanization and decline in blue-collar tasks, and the expansion of professional and educational services occupations.

Overall Trends in Employment

The employment of scientists and engineers as a group increased by over 155 percent between 1950 and 1966—a compound average annual rate of over 6 percent—from 550,800 to 1,412,500 workers. (See table 3.) This was a more rapid

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[7] The white-collar occupational group includes the professional, technical, and kindred workers (including scientists and engineers); managers, officials, and proprietors (excluding farm); clerical and kindred workers; and the sales workers.

TABLE 3.—ESTIMATED EMPLOYMENT OF TOTAL SCIENTISTS AND ENGINEERS, 1950–66

Year	Number			As percent of total	
	Total	Scientists	Engineers	Scientists	Engineers
1950	550,800	146,300	404,600	26.5	73.5
1951	606,100	159,000	447,000	26.2	73.8
1952	679,600	175,800	503,700	25.9	74.1
1953	741,900	189,600	552,200	25.6	74.4
1954	776,600	199,600	577,000	25.7	74.3
1955	806,300	208,500	597,800	25.0	74.1
1956	867,000	224,700	642,400	25.9	74.1
1957	952,700	248,900	703,800	26.1	73.9
1958	995,100	268,900	726,100	27.0	73.0
1959	1,051,300	287,500	763,800	27.3	72.7
1960	1,097,300	300,500	796,700	27.4	72.6
1961	1,144,600	316,000	828,500	27.6	72.4
1962	1,204,300	334,800	869,400	27.8	72.2
1963	1,273,500	355,100	918,300	27.9	72.1
1964	1,320,100	378,800	941,300	28.7	71.3
1965	1,361,300	395,500	965,800	29.1	70.9
1966	1,412,500	416,800	996,000	29.5	70.5

Source: Bureau of Labor Statistics.

rate than that for total employment in the economy, total white-collar workers, or the professional, technical, and kindred workers group, which increased by 24, 49, and 108 percent respectively over the 16-year period. Thus, scientists and engineers increased from nearly 1 percent to almost 2 percent of total employment between 1950 and 1966. (See chart 4.)

Concurrently with this sustained growth in the employment of scientists and engineers, gross national product during 1949-65 increased more than 166 percent (in constant prices, 90 percent), industrial production, over 121 percent;[8] and expenditures for research and development, almost 300 percent (for the 1953-65 period).[9] The increased employment of scientists and engineers during the first half of the 16-year period was influenced primarily by general growth of the economy, the expansion of industrial output for the Korean conflict, growth of university facilities to accommodate increasing enrollments, and the development of sophisticated new defense measures involving electronics, aircraft, missiles, atomic energy, and many technological innovations. The

TABLE 4. ESTIMATED EMPLOYMENT OF SCIENTISTS AND ENGINEERS ENGAGED IN RESEARCH AND DEVELOPMENT, 1950–66

Year	Scientists and engineers		
	Total	Engaged in R&D	
		Number	Percent of total
1950	550,800	152,200	27.6
1951	606,100	169,300	27.9
1952	679,600	198,600	29.2
1953	741,900	221,500	29.9
1954	776,600	237,100	30.5
1955	806,300	243,000	30.1
1956	867,000	265,100	30.6
1957	952,700	302,300	31.7
1958	995,100	323,300	32.5
1959	1,051,300	354,200	33.7
1960	1,097,300	379,500	34.6
1961	1,144,600	402,800	35.2
1962	1,204,300	435,500	36.2
1963	1,273,500	471,200	37.0
1964	1,320,100	490,500	37.2
1965	1,361,300	503,700	37.0
1966	1,412,500	520,500	36.8

Source: Bureau of Labor Statistics.

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[8] Source of industrial production data used in this report is from U.S. Department of Commerce, *Business Statistics, 1967*. Washington, D.C. 20402: Supt. of Documents, U.S. Government Printing Office.

[9] Comparable data for earlier years are not available.

continued employment expansion during the last half of the period received added impetus from the tremendous rise in R&D expenditures, primarily for defense- and space-related applications.

Because of the rapid rise in R&D expenditures, the number of scientists and engineers primarily engaged in R&D activities grew at a faster rate than the total employment—about 8.0 percent per year, rising from 152,200 in 1950 to 520,500 in 1966. (See table 4.) However, paralleling the downturn in the growth rate of R&D expenditures, that for R&D personnel slowed from 9.8 percent annually for the 1950-59 period to 5.7 percent for 1959-66. As a proportion of the total, scientists and engineers engaged in R&D activities increased steadily from 28 percent in 1950 to 37 percent in 1966.

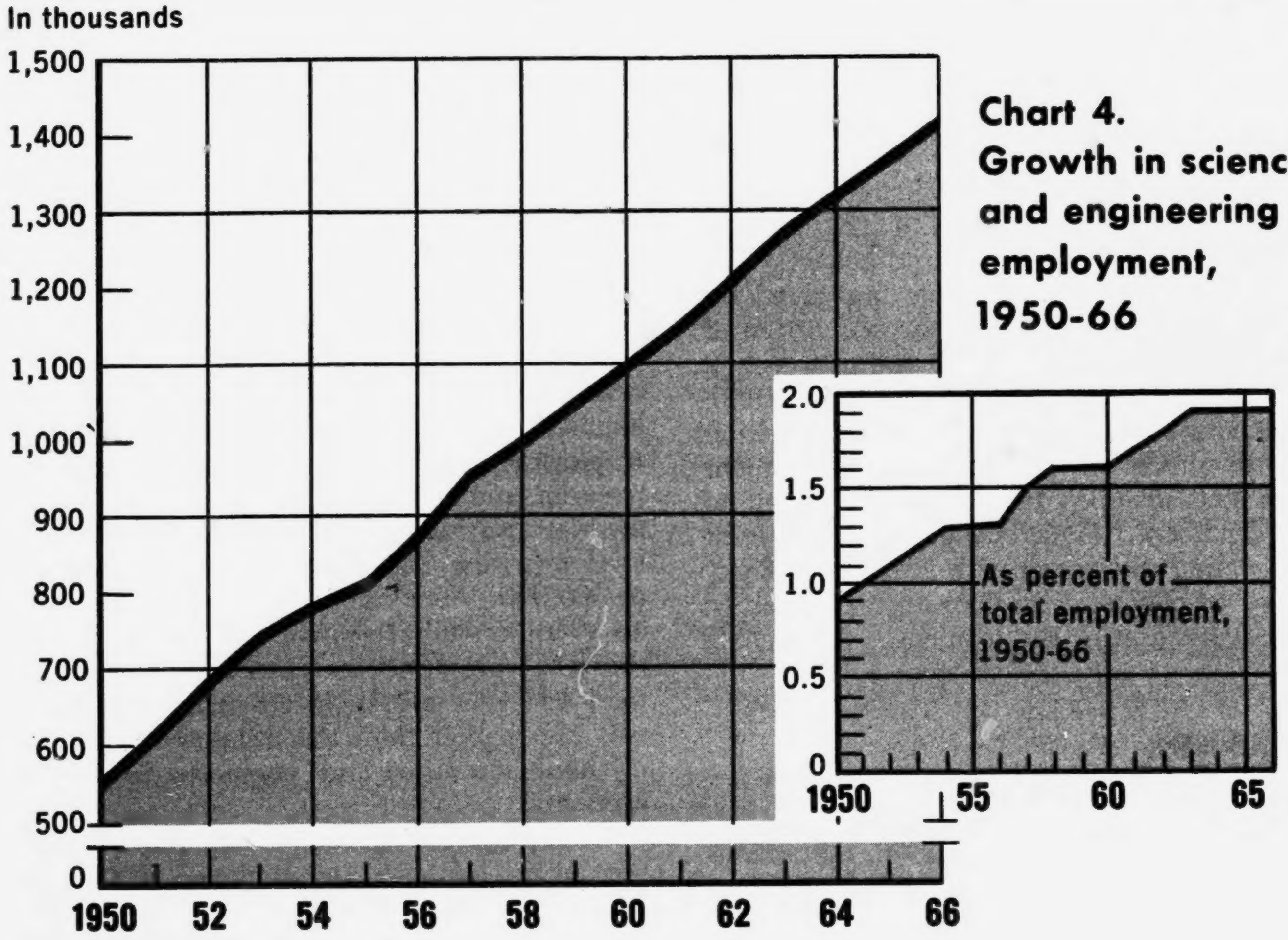

Chart 4. Growth in science and engineering employment, 1950-66

Source: Bureau of Labor Statistics

Employment by Sector

Most of the scientists and engineers were employed in private industry, with 997,600 or 71 percent of the total in 1966. (See appendix table A-1.) Governments (Federal, State, and local) were the next largest employer with 220,000 (16 percent), followed by universities and colleges with 180,700 (13 percent) and nonprofit organizations, with 14,700 (1 percent). While the proportion of scientists and engineers in private industry stayed at about 71 percent between 1950 and 1966, universities and colleges increased their share from 9 percent to almost 13 percent, and employment by governments dropped from over 19 percent to less than 16 percent. These changes were the result of a greater than average growth rate in university and college employment and lower than average growth in government employment. (See chart 5.)

Private Industry

Manufacturing Industries

Within the private industry sector, the manufacturing industries, which employed 47 percent of the Nation's scientists and engineers in 1966, accounted for approximately one-half of the total growth in these personnel between 1950 and 1966. They increased at an average rate of 6.7 percent annually between 1950 and 1966. However, this growth, which was higher than the overall annual rate of 6.1 percent, was not consistent throughout the period. Employment of scientists and engineers in manufacturing increased an average 15.0 percent per year from 238,000 in 1950 to 362,500 in 1953, a period of high economic activity resulting from a high demand for durable consumer goods and new plant investment, large Federal expenditures for military items, and favorable balances in export trade. Growth continued between 1953 and 1966 at a much lower rate (about 4.8 percent annually) to 668,800 in 1966.

The number of scientists and engineers in manufacturing continued to increase each year in spite of a decline in all manufacturing employment, which fell below the 1953 level in 1954 and remained there until 1965. The increases can be largely attributed to a changing occupational composition in favor of highly trained workers and a very rapid increase in research and development in manufacturing industries, which performed over 97 percent of the industry total in 1966. The R&D expenditures rose at an average rate of 11.9 percent per year between 1953 and 1966, from $3.6 billion to $15.5 billion.[10] As would be expected, employment of scientists and engineers engaged in research and development[11] in manufacturing industries also increased substantially over the 1950 level by rising 283 percent by 1966 from 80,000 to 305,000. (See appendix table A-2.) This was an average annual growth rate of 8.8 percent for the R&D personnel, compared to 6.7 percent for total scientists and engineers in manufacturing. It was also higher than the 8.0-percent growth rate of R&D scientists and engineers in the overall economy.

In 1966, R&D personnel accounted for 46 percent of the scientists and engineers in manufacturing, rising from 33 percent in 1950, whereas for the entire economy the proportion rose from 28 percent in 1950 to 37 percent in 1966. Of all the R&D scientists in the economy, 59 percent were employed in manufacturing industries.

Over three-fourths of the total growth of scientists and engineers in manufacturing occurred within five major industries—electrical equipment, chemicals, aircraft, machinery, and ordnance.

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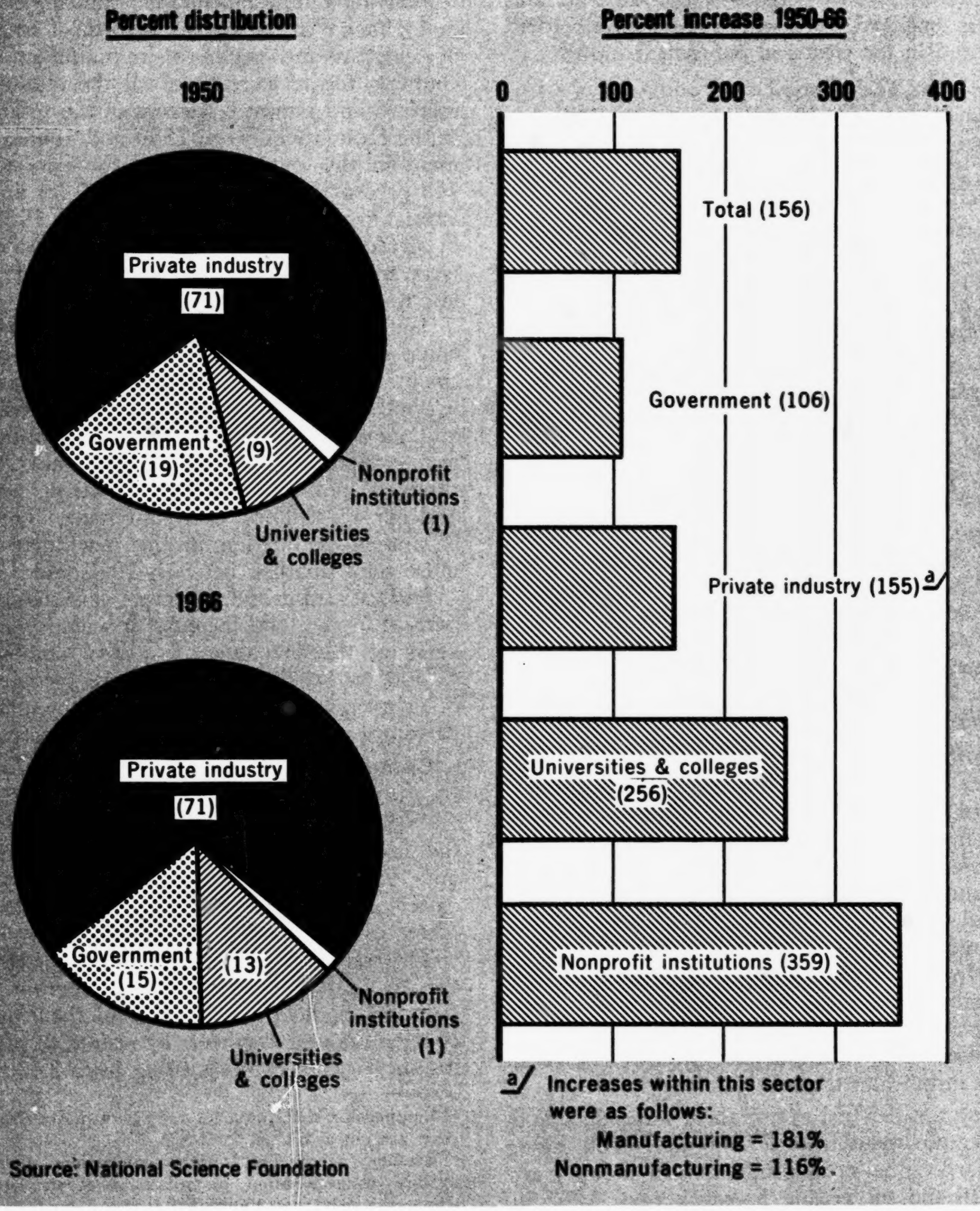
[10] Comparable R&D data for earlier years are not available.

[11] As defined for this report, R&D activity includes basic and applied research in the sciences and engineering and the design and development of prototypes and processes. Excluded are routine product testing, marketing research, sales promotion, sales service, research in the social sciences or psychology, and other non-technical activities and technical services. The R&D expenditures data presented by industry in this report are not strictly comparable to the employment data by industry, since employment data are based on the industrial classification of the employing establishment while R&D data are on the overall industrial classification of the company.

Electrical equipment. Within manufacturing, employment of scientists and engineers in the electrical equipment industry grew from 44,000 in 1950 to 145,000 in 1966, an increase of 227 percent or an average annual growth rate of 7.7 percent. In 1966, over 10 percent of the Nation's scientists and engineers were employed in this industry. The increase resulted primarily from a rapidly increasing demand for electrical and electronic products for both civilian consumption and military use (the in-

Chart 5. Employment of scientists and engineers, by sector



a/ Increases within this sector were as follows:
Manufacturing = 181%
Nonmanufacturing = 116%.

Source: National Science Foundation

dustry's volume of production over the period increased by over 220 percent) and a rise in R&D expenditures, which approximately doubled between 1957[12] and 1966.

The electrical equipment industry's R&D scientists and engineers increased at a faster rate than the total, averaging about 9.0 percent annually. In 1950, R&D personnel constituted 43 percent of the total scientists and engineers, but by 1966 this proportion had increased to over 52 percent, or 76,000.

In 1966 almost 15 percent of the scientists and engineers engaged in research and development were found in the electrical equipment industry.

Chemicals. The second largest employer of scientists and engineers in manufacturing in 1966 was the chemicals and allied products industry with 98,000, a 148-percent increase, or 5.8 percent per year, from 39,000 in 1950.

This employment gain occurred during a period of rapid growth in demand for products of the chemicals industry; its annual production volume increased by almost 300 percent during the period. Rising R&D activity also contributed to the increased employment, with R&D expenditures in the chemicals industry totaling over $1.5 billion or 10 percent of total industrial R&D expenditures in 1966—more than double the amount ($0.7 billion) spent in 1957.

There were 43,000 scientists and engineers engaged in research and development in the chemicals industry in 1966—a 228-percent increase over the 13,000 in 1950. R&D personnel increased at a faster rate than did the total, increasing from 33 percent of total scientists and engineers in 1950 to 44 percent in 1966. At that time, over 8 percent of all the R&D scientists and engineers in the Nation were employed in the chemicals industry.

Aircraft. Almost 6 percent of the country's scientists and engineers were employed in the aircraft and parts industry in 1966. This industry was the second fastest growing employer of scientists and engineers during the 16-year period, with an average annual rate of over 10 percent since 1950 exceeded only by the ordnance industry. Total employment of these scientists and engineers increased from 18,000 to 83,000, or 373 percent. Most of this growth—over 90 percent of the total change—occurred during the 1950-57 period when both the volume of production and employment of all workers more than tripled.

During the 1957-61 period there was a decline in actual employment from 77,800 to 74,100, along with sharp cutbacks in production of military aircraft. In the succeeding 5-year period, 1962-66, employment rose to 83,300 as production increased and R&D activities were expanded.

R&D personnel in the aircraft industry increased by 470 percent between 1950 and 1966, rising from 9,300 to 53,000. This growth generally followed the pattern of total scientists and engineers in the aircraft industry; however, because of a growing emphasis on research and development, R&D scientists and engineers rose in proportion to the total, from 53 percent in 1950 to 64 percent in 1966.

Machinery. The machinery[13] industry was also a major factor in the overall growth of employment of scientists and engineers in manufacturing, accounting for 11 percent of all the manufacturing increase and almost 6 percent of the total increase in the economy between 1950 and 1966. Employment in this industry during the period rose by 143 percent from 33,600 to 81,600 for an average annual growth rate of 5.7 percent. In 1966, almost 6 percent of the Nation's scientists and engineers were employed in the machinery industry, slightly less than the proportion in 1950.

The rise in employment of these scientists and engineers resulted from growth in the demand for the industry's products, which include manufacturing and industrial machinery; construction, mining, and materials handling equipment; farm machinery and equipment; engines and turbines (the only products not experiencing growth); accounting and office machines; and computers. The volume of annual production in the machinery industry more than doubled between 1950 and 1966.

R&D scientists and engineers accounted for 43.5 percent of the total increase in scientists and engineers in the machinery industry, climbing from 11,400 to 32,300 for an annual average rate of 6.7 percent. As a proportion of the total, R&D personnel rose from 34 percent to 40 percent.

Ordnance. The ordnance industry in 1966 employed almost 9 percent of the scientists and engineers in manufacturing and 4 percent of those in the national economy. The increase between 1950 and 1966 was the most spectacular of any industry or sector, rising from 2,100 to 59,900 for an estimated average annual rate of over 23.0 percent.

The ordnance industry is obviously highly sensitive to changes in the defense program. This is reflected in the rapid increase in the employment of scientists and engineers by ordnance plants during the Korean conflict, rising from 2,100 in 1950 to 16,200 by 1953. Employment then declined somewhat through 1956, but resumed growth with the increasing requirements for guided missiles and space vehicles from 14,600 to 59,900 between 1956 and 1966. This growth trend, which continued in spite of a decline of about 14 percent in overall employment in the ordnance industry between 1963 and 1966, reflects the rapid technological change occurring in this industry.

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[12] Comparable R&D data for individual industries in earlier years are not available.

[13] Excludes machinery for the generation, storage, transmission, transformation, or utilization of electrical energy, which the electrical equipment industry comprises.

Scientists and engineers engaged in R&D activities in the ordnance industry experienced an even greater growth rate than the total—almost 30 percent annually between 1950 and 1966—rising from 600 to over 37,000. In 1966 they were 62 percent of the total scientists and engineers in ordnance. This was the highest ratio of any industry or sector except aircraft.

As in the total, the greatest increase in R&D personnel occurred after 1956. It is estimated that funds expended in the ordnance industry for research and development more than doubled during that period.[14]

Professional and scientific instruments. The only other major manufacturing industry to show an above-average growth rate for scientists and engineers between 1950 and 1966 was professional and scientific instruments, which showed an increase from 10,500 to 35,600 for an average annual growth of 7.9 percent. In 1966, 2.5 percent of the Nation's scientists and engineers were in this industry, of whom 42 percent were primarily engaged in R&D activities.

While a great diversity of products is produced by this industry, the largest proportion of the workers is employed in the firms manufacturing scientific and related instruments, and employment therefore was particularly responsive to overall spending for research and development in the economy.

Nonmanufacturing

Employment of scientists and engineers in the nonmanufacturing industries of the private industry sector increased from 152,500 in 1950 to 328,800 in 1966 for an estimated average annual growth rate of 4.9 percent. The 1966 total represented 23 percent of the country's employment of scientists and engineers. Of the 1966 total, 20 percent were engaged in research and development.

Over one-half of the nonmanufacturing employment in 1966 was in three industries—contract construction, engineering and architectural services, and miscellaneous business services.

Contract construction. The contract construction industry employed 52,000 scientists and engineers in 1966, a 110-percent increase over 1950 for an annual growth rate of 4.7 percent. Engineers were over 99 percent of the 1966 total in construction. Less than 2 percent of the 1966 total was engaged in research and development. The growth in this industry was mainly due to an increase in activities in electrical, plumbing, and air conditioning contract work and in construction of buildings, highways, bridges, dams, airports, and similar projects.

Engineering and architectural services. The engineering and architectural services industry employed 93,000 engineers and scientists in 1966—more than double the 1950 level. In 1966, 15 percent of these personnel were engaged in research and development. The growth in this industry reflects an extension of demands for engineering and technical services by the user industries and has been particularly responsive to the construction boom.

Miscellaneous business services. Scientific and engineering personnel of the miscellaneous business services industry increased from 23,000 in 1950 to 57,000 in 1966. Nearly three-fourths of this 1966 employment was engaged in research and development. The increase in scientists and engineers in this industry was primarily due to the growth in independent R&D laboratories.

Government

There were 219,500 scientists and engineers employed in all levels of government—Federal, State, and local—in 1966. This was an increase of 106 percent over the 1950 level of 106,400. Because the growth rate in governments was slower than the overall rate, the proportion of these government employees to total scientists and engineers in the economy fell from 19 percent in 1950 to 16 percent in 1966. Of the 1966 government employees, 32 percent were primarily engaged in R&D activities.

Federal Government. In 1966, 61 percent of the scientists and engineers in the government sector were employed in the Federal Government.[15]

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[14] Data on R&D funds for this industry are not separately available; however, estimates for applied research and development expenditures for ordnance, guided missiles, and spacecraft show an increase from $1.8 billion to $4.1 billion between 1959 and 1966. See National Science Foundation, *Reviews of Data on Science Resources,* No. 12, "Research and Development in Industry, 1966," NSF 68–14. Washington, D.C. 20402: Supt. of Documents, U.S. Government Printing Office, January 1968.

[15] For a more detailed examination of Federal employment of scientists and engineers, see National Science Foundation, *Reviews of Data on Science Resources,* No. 14, "Scientific and Technical Personnel in the Federal Government, 1966," NSF 68–16. Washington, D.C. 20402: Supt. of Documents, U.S. Government Printing Office, April 1968.

Between 1950 and 1966, federally employed scientists and engineers increased from 59,600 to 134,100 for an average annual growth of 5.2 percent—less than the overall economy's rate of 6.1 percent. Because of this below-average growth, the proportion of the Nation's scientists and engineers employed by the Federal Government fell from almost 11 percent in 1950 to less than 10 percent in 1966. The overall growth in these Federal employees during the period is mainly attributable to an expansion of intramural R&D projects related primarily to defense and space research and exploration programs. Between 1950 and 1966, Federal expenditures for these intramural R&D activities rose from less than $1.0 billion[16] to over $3.2 billion.

Scientists and engineers engaged in research and development in the Federal Government increased from 25,300 in 1950 to 66,800 in 1966, about 6.3 percent per year. In 1966, R&D personnel constituted almost 50 percent of the total, an increase from the 42-percent ratio of 1950.

State government. Employment of scientists and engineers by State governments grew at a slightly lower rate than the Federal sector, at about 4.2 percent annually between 1950 and 1966, rising from 26,400 to 51,700. As noted previously, scientists and engineers employed by public universities and colleges have not been included in the data for the State government sector. Of the non-education personnel in 1966, only 6.4 percent were engaged in research. The growth in State employment of scientists and engineers was primarily due to the growing population and associated programs for expanding public health, sanitation, welfare, protective, transportation, and related services.

Local government. Local government employment of scientists and engineers expanded at a relatively low growth rate of 3.2 percent annually between 1950 and 1966, rising from 20,400 to 33,700 non-education personnel. The growing population and increasing urbanization have undoubtedly been the impetus to greater local government services, resulting in increased employment of scientists and engineers.

Universities and Colleges

In 1966, almost 13 percent of the Nation's scientists and engineers were employed in universities and colleges. This employment rose by 256 percent between 1950 and 1966, growing from 51,000 to 180,700. The primary causes of the increasing employment of scientists and engineers in this sector have been twofold—the rise in enrollments requiring larger faculties and the extensive growth in research activities with the accompanying increase in staff requirements.

Data on student enrollments by field for the period 1950-66 are not available for comparison, but the number of bachelor's degrees awarded in all the natural sciences and engineering combined for the period 1950-51 through 1965-66 shows an increase of about 17 percent, rising from about 94,000 to about 110,000. The large number of degrees granted during most of the 1950-51 to 1954-55 period reflected in large measure the heavy upsurge in post-World War II enrollments. By academic year 1954-55 the number of degrees had declined to about 58,000 and thereafter exhibited a growth trend of about 6.2 percent per year, or a total increase between 1954-55 and 1965-66 of 94 percent. On the graduate school level, enrollments also increased substantially over the same period, with combined master's and doctor's degrees in science and engineering increasing from about 15,000 in 1954-55 to about 43,000 in 1965-66, or about 187 percent.

The funds expended for research and development during 1953-66 by universities and colleges and their associated Federally Funded Research and Development Centers rose by over 500 percent. Scientists and engineers who spent the greater proportion of their time in R&D activities increased by 186 percent in this sector between 1950 and 1966. It is noteworthy that the proportion of R&D personnel to the total declined from 45 percent in 1950 to 36 percent in 1966. This was the only major sector where the R&D personnel growth rate was slower than for the non-R&D personnel.

Nonprofit Institutions

Scientists and engineers employed by independent nonprofit institutions increased from 3,200 in 1950 to 14,700 in 1966, an average increase of 10.0 percent per year. The proportion engaged in research and development in 1966—87 percent—was by far the largest proportion of R&D personnel to total scientists and engineers of any sector. The nearly fourfold increase of scientists and engineers is largely the result of the increasing volume of federally funded R&D projects contracted to institutions in the nonprofit sector. Federally funded R&D expenditures in this sector rose from $50 million to $520 million between 1953 and 1966, and total R&D expenditures rose from $110 million to $730 million.

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[16] Estimated for 1950. In 1953, such expenditures totaled $1.0 billion. Comparable data for earlier years are not available.

Employment by Occupation

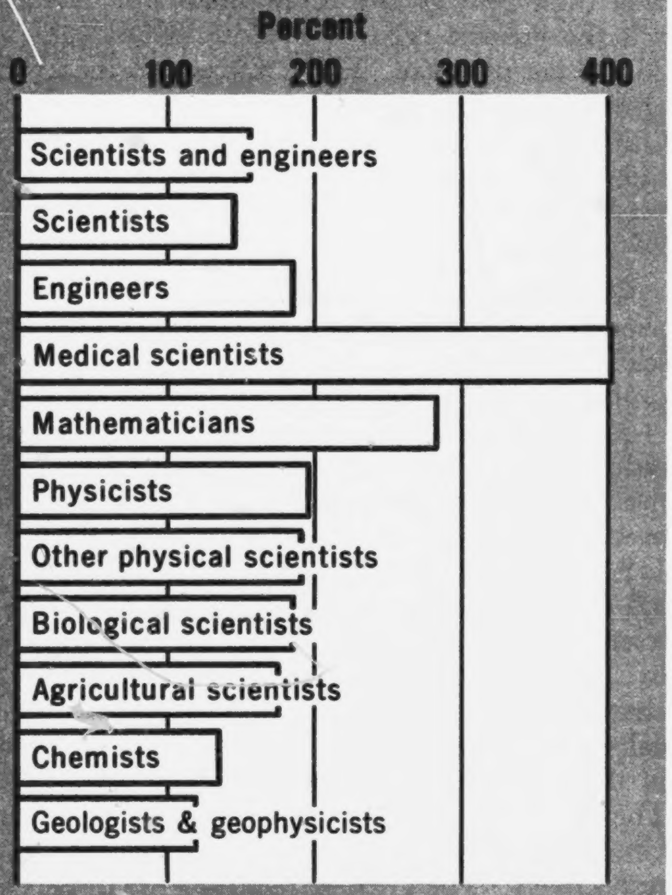
Engineers

Employment of engineers more than doubled from 404,600 in 1950 to 996,000 in 1966, or an annual average of 5.8 percent over the 16-year period. (See appendix table A-3 and chart 6.) Three-fifths of the entire increase occurred within the manufacturing industries, led by electrical equipment, which increased by 95,100 personnel. Aircraft increased by 60,200, ordnance by 49,600, and machinery by 43,800. The nonmanufacturing industries increased their employment of engineers by 144,600, from 129,500 in 1950 to 274,100 in 1966. Within this group, the largest increase was 49,600 in engineering and architectural services, followed by 19,200 more in miscellaneous business services. Slightly offsetting the overall increase was a decline of 1,100 engineers in the railroad industry—the only specified industry in the economy to record a significant loss during the period. Other large increases in engineering employment occurred in the Federal Government and universities and colleges, which rose by 41,300 and 23,900, respectively.

The rate of growth of engineer employment varied widely among the sectors and industries. By far the highest growth rate occurred in the ordnance industry, with an average annual increase of 23 percent, followed by aircraft and parts at 10.2 percent. Above-average growth rates also occurred in electrical equipment (7.8 percent), professional and scientific instruments (8.0 percent), radio and television (8.0 percent), and public utilities (6.0 percent). The nonprofit institutions (10.7 percent) and the universities and colleges (7.4 percent) sectors also had above-average growth rates.

Of the total number of scientists and engineers employed in 1966, engineers were almost 71 percent of the 1,412,500 total. However, since the 5.8-percent average annual growth rate of engineers was below the 6.7-percent rate for scientists, engineers as a proportion of the total declined from the 1950 ratio of nearly 74 percent. (See chart 7.) By sector in 1966, engineers were 81 percent of total scientists and engineers in private industry, 66 percent in governments, 19 percent in universities and colleges, and 31 percent in the nonprofit

Chart 6.
Percent increase in science and engineering employment, by occupation, 1950–66



Source: National Science Foundation

institutions sector. These proportions represented no change from 1950 for private industry, declines in governments from 71 percent and in universities and colleges from 22 percent, and an increase in the nonprofit sector from 28 percent.

Scientists

Scientist employment grew from 146,300 in 1950 to 416,800 in 1966, or by 185 percent. (See appendix table A-4.) The largest proportion of this growth—almost 40 percent—occurred in the universities and colleges sector, which increased by 106,100 personnel.

Manufacturing industries accounted for 30 percent of the increase, or 80,400, with the chemicals industry contributing nearly one-half of this rise in employment. The only other large absolute increases in employment occurred in the Federal Government, which rose by 33,200, and in miscellaneous business services, which increased by 14,700. Relative growth rates among the various sectors and industries differed widely, however. For example, while the ordnance industry's absolute growth from 200 to 8,400 scientists accounted for only 3 percent of the total economy's change, it was the greatest relative increase, averaging about 26 percent per year. This compares to the average growth rate for all sectors of only 6.7 percent. Other sectors and industries having high growth rates were aircraft, nonprofit institutions, and universities and colleges, with average annual rates of 9.8, 9.7, and 8.5 percent, respectively.

Chemists. Chemists make up the largest natural science occupation, more than one-fourth of all scientists in 1966. (See table 5.) The largest proportion of the employment of chemists in 1966 —34 percent—was concentrated in the chemicals industry, of which the drug component absorbed the major part. Employment more than doubled over the 16-year period, increasing from 51,200 to 119,300 for an average annual growth of about 5.5 percent; however, as a proportion of total scientists, they declined by 6.5 percentage points to 28.7 percent. (See appendix table A-5 and chart 8.) As would be expected the largest numerical increase in employment of chemists occurred in the chemicals industry with a gain of 26,900. The universities and colleges sector and the Federal Government showed gains of 9,100, and 5,200, respectively. The greatest relative growth occurred in the ordnance industry, which rose from less than 50 to 1,600, or by about 24.0 percent per year. Other industries with rapid annual growth rates were professional and scientific instruments (9.2 percent), aircraft (8.6 percent), and local governments (7.6 percent).

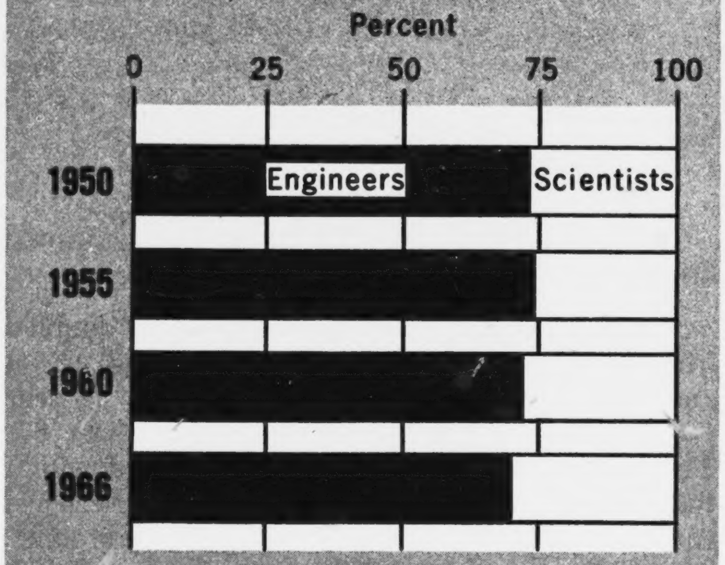


Chart 7. Relationship of scientists and engineers, 1950-66

Source: National Science Foundation

Physicists. Employment of physicists tripled over the 1950-66 period, rising from 13,700 to 41,000 for a growth rate of about 7.0 percent per year. Universities and colleges accounted for over two-fifths of the increase, rising from 5,600 to 17,700. Other large absolute increases occurred in the Federal Government, miscellaneous business services, and ordnance, with gains of 3,600, 3,200, and 2,300 respectively. Only five categories experienced above-average growth rates. These were ordnance, at a very high 22.0 percent annually; chemicals and nonprofit institutions, with 9 percent each; and miscellaneous business services and universities and colleges, 8.0 and 7.5 percent respectively. In 1966, 17,700, or over 43 percent of the total, were employed by universities and colleges. (See appendix table A-6.)

Geologists and geophysicists. Employment of geologists and geophysicists increased less rapidly than that of other physical scientists, rising from 11,200 in 1950 to 24,400 in 1966 (appendix table A-7) for an average annual growth rate of 5.0 percent. These personnel were concentrated in mining and in universities and colleges, which accounted for 10,400 and 6,100 respectively of the 1966 employment, or over two-thirds of the total. These areas also accounted for nearly two-thirds of the absolute increase between 1950 and 1966. Mining, however, showed a low average growth of only 2.4

percent per year, while universities and colleges were well above average at 10.7 percent yearly.

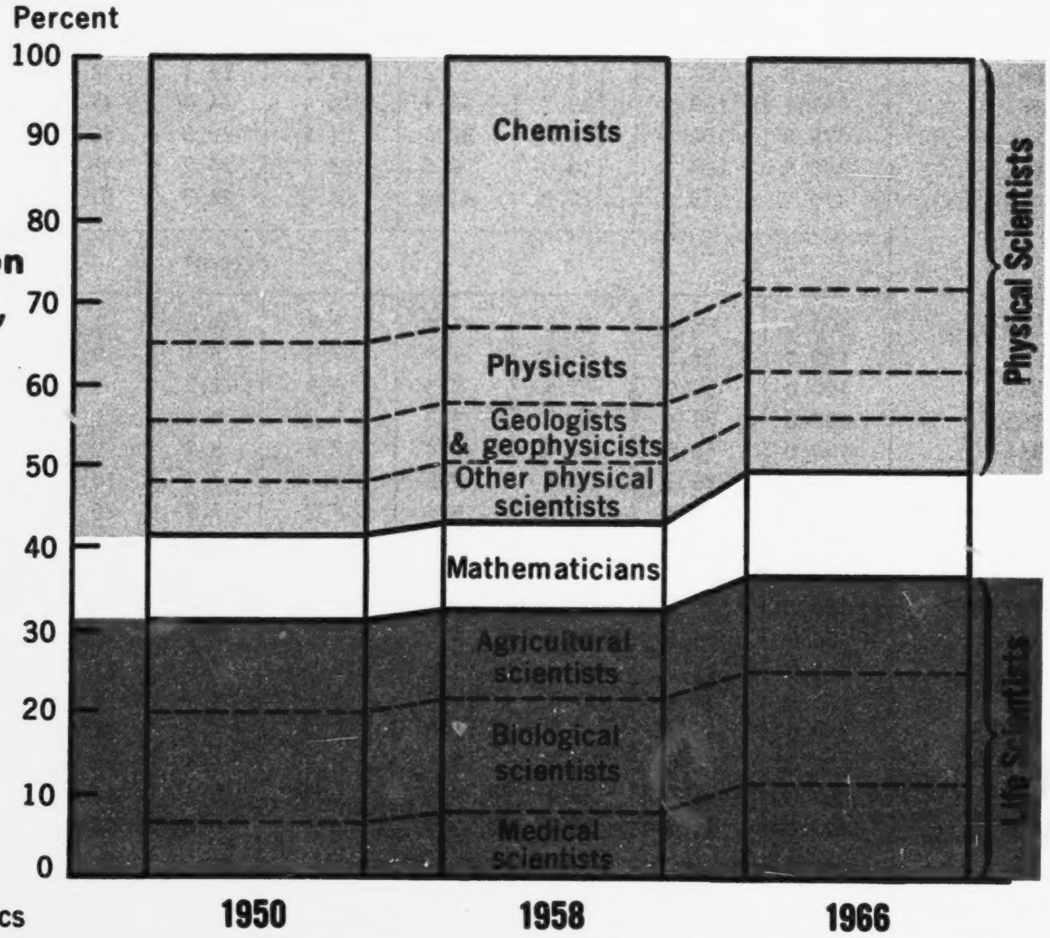
Other physical scientists. Employment in physical science occupations not specified above totaled 28,300 in 1966, an increase of 192 percent from the 1950 level of 9,700 (appendix table A-8). This group includes metallurgists, meteorologists, and other types of physical and earth scientists, whose specialties probably cut across several disciplines.

Mathematicians. Employment of mathematicians grew much faster than that of scientists as a whole, increasing by nearly 300 percent from 13,500 to 51,800 (appendix table A-9) for an average annual gain of nearly 8.7 percent. In 1966, 34 percent of the total employment was in the universities and colleges sector. This sector also accounted for 35 percent of the overall gain, rising from 4,100 in 1950 to 17,500 in 1966 for a growth rate of 9.5 percent per year—about the same as for overall. The fastest relative growth was experienced in the ordnance industry, which grew from 100 in 1950 to 3,100 in 1966, or by 24.0 percent per year. Nonprofit organizations and aircraft were also well above average with growth rates of 18.4 and 15.0 percent respectively.

Agricultural scientists. Employment of agricultural scientists grew from 17,200 in 1950 to 47,600 by 1966 (appendix table A-10). Employment in this, as in other life science occupations, was heavily concentrated in the governments and universities and colleges sectors. In 1966, 42 percent were employed in the latter institutions, 33 percent by the Federal Government, and 12 percent by State and local governments. The governments and universities and colleges sectors combined accounted for nearly 90 percent of the total rise in employment over the 16-year period. The growth rate of the governments sector, however, was only 4.4 percent, in comparison with the overall average of 6.6 percent per year, while the universities and colleges sector was over 11.3 percent.

Biological scientists. Employment of biological scientists rose from 19,900 to 56,800 between 1950 and 1966 for an annual average growth of nearly 6.8 percent. Over one-half of the 1966 employment was in the universities and colleges sector. This sector's growth rate, however, was only slightly higher than average. The fastest relative growth occurred in the ordnance industry, which rose from less than 50 to 300 over the period. Nonprofit organizations also had a high growth rate, from 600 to 2,900 personnel (appendix table A-11).

Chart 8.
Occupational distribution of scientists 1950, 1958, and 1966



Source: Bureau of Labor Statistics

Medical scientists. Employment of medical scientists increased from 9,200 in 1950 to 46,200 in 1966, or by 400 percent—more than twice the overall scientist increase. Universities and colleges accounted for nearly three-fourths of the total growth and in 1966 employed 32,400, or 70 percent of all medical scientists. Federal, State, and local governments together employed 5,300; and 4,500 of them were employed in the chemicals industry (primarily in drugs and pharmaceuticals). Between 1950 and 1966 the government sector's medical scientists had an average annual growth of 6.6 percent; the chemicals industry, 5.2 percent (appendix table A-12).

TABLE 5. ESTIMATED EMPLOYMENT OF SCIENTISTS, BY OCCUPATIONAL GROUP, 1950–66

Year	Total	Physical scientists					Mathematicians	Life scientists			
		Total	Chemists	Physicists	Geologists and geophysicists	Other		Total	Agricultural	Biological	Medical
	Number in thousands										
1950	146.3	85.8	51.2	13.7	11.2	9.7	13.5	46.3	17.2	19.9	9.2
1951	159.0	94.1	56.1	14.8	11.5	11.7	14.4	49.6	18.5	21.2	9.9
1952	175.8	104.9	62.1	16.3	12.0	14.5	15.8	54.4	20.7	23.0	10.7
1953	189.6	114.2	66.8	17.5	13.7	16.2	17.4	57.4	21.8	24.1	11.5
1954	199.6	119.9	70.5	18.6	14.3	16.5	19.3	59.7	22.0	25.5	12.2
1955	208.5	123.9	72.8	19.3	15.3	16.5	20.9	62.8	22.6	27.3	12.9
1956	224.7	132.7	78.1	20.9	16.1	17.6	22.9	68.3	24.1	29.9	14.3
1957	248.9	143.9	83.3	23.1	17.9	19.6	25.8	78.0	26.0	34.8	17.2
1958	268.9	152.9	89.3	25.5	18.4	19.7	28.2	86.3	27.7	39.0	19.6
1959	287.5	161.8	94.3	27.9	19.1	20.5	31.1	93.5	29.9	42.5	21.1
1960	300.5	167.2	98.4	29.1	18.5	21.2	33.6	98.3	30.9	44.7	22.7
1961	316.0	174.0	101.6	30.9	18.7	22.8	35.2	105.2	32.8	46.9	25.5
1962	334.8	181.3	105.6	33.2	19.2	23.3	38.5	113.5	35.8	48.9	28.8
1963	355.1	188.9	108.7	35.4	20.4	24.4	41.9	123.0	39.0	51.3	32.7
1964	378.8	198.6	113.5	38.1	21.5	25.5	45.4	133.6	42.1	54.3	37.2
1965	395.5	204.8	116.0	39.0	23.6	26.2	48.9	141.2	44.7	55.6	40.9
1966	416.7	213.0	119.3	41.0	24.4	28.3	51.8	150.6	47.6	56.8	46.2
	Percent										
1950	100.0	58.9	35.2	9.4	7.7	6.7	9.3	31.8	11.8	13.7	6.3
1951	100.0	59.5	35.5	9.4	7.3	7.4	9.1	31.4	11.7	13.4	6.3
1952	100.0	59.9	35.5	9.3	6.9	8.3	9.0	31.1	11.8	13.1	6.1
1953	100.0	60.4	35.3	9.3	7.2	8.6	9.2	30.4	11.5	12.8	6.1
1954	100.0	60.3	35.4	9.4	7.2	8.3	9.7	30.0	11.1	12.8	6.1
1955	100.0	59.7	35.1	9.3	7.4	7.9	10.1	30.3	10.9	13.2	6.2
1956	100.0	59.3	34.9	9.3	7.2	7.9	10.2	30.5	10.8	13.4	6.4
1957	100.0	58.1	33.6	9.3	7.2	7.9	10.4	31.5	10.5	14.0	6.9
1958	100.0	57.2	33.4	9.5	6.9	7.4	10.5	32.3	10.4	14.6	7.3
1959	100.0	56.5	32.9	9.7	6.7	7.2	10.9	32.6	10.4	14.8	7.4
1960	100.0	55.9	32.9	9.7	6.2	7.1	11.2	32.9	10.3	14.9	7.6
1961	100.0	55.3	32.3	9.8	5.9	7.3	11.2	33.5	10.4	14.9	8.1
1962	100.0	54.4	31.7	10.0	5.8	7.0	11.6	34.1	10.7	14.7	8.6
1963	100.0	53.4	30.7	10.0	5.8	6.9	11.8	34.8	11.0	14.5	9.2
1964	100.0	52.6	30.1	10.1	5.7	6.8	12.0	35.4	11.1	14.4	9.9
1965	100.0	51.9	29.4	9.9	6.0	6.6	12.4	35.8	11.3	14.1	10.4
1966	100.0	51.3	28.7	9.9	5.9	6.8	12.5	36.3	11.5	13.7	11.1

Note: Details may not add to totals because of rounding.
Source: Bureau of Labor Statistics.

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APPENDIX A

Statistical Tables

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TABLE A-1. ESTIMATED EMPLOYMENT OF SCIENTISTS AND ENGINEERS, BY SECTOR, 1950-66

(In thousands)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	550.8	606.1	679.6	741.9	776.6	806.3	867.0	952.7	995.1	1,051.3	1,097.3	1,144.6	1,204.3	1,273.5	1,320.1	1,361.3	1,412.5
Private industry	390.5	433.7	493.9	550.7	583.0	603.8	649.6	713.3	737.2	771.4	805.2	835.7	872.3	917.4	939.2	960.9	997.6
Manufacturing	238.0	268.7	318.9	362.5	384.5	391.2	418.4	469.0	487.6	511.8	540.7	567.2	592.8	626.3	632.0	646.4	668.8
Ordnance	2.1	3.0	10.4	16.2	16.1	14.8	14.6	18.2	17.9	29.4	34.2	40.7	47.2	52.9	54.6	58.5	59.9
Food	8.3	9.1	9.6	9.9	10.3	10.6	10.9	11.3	11.6	12.2	12.7	13.2	12.7	13.1	12.2	12.2	12.0
Textiles and apparel	3.1	3.4	3.5	3.6	3.6	3.8	3.8	3.9	3.9	4.0	4.2	4.0	4.2	4.4	5.2	5.9	6.4
Lumber and furniture	2.2	2.5	2.6	2.7	2.7	2.7	2.9	3.0	3.0	3.2	3.3	3.4	3.4	3.4	3.5	3.7	4.0
Paper	6.1	6.9	7.4	8.0	8.3	9.0	9.8	10.4	10.8	11.1	11.9	12.8	13.7	13.7	13.6	14.0	14.4
Chemicals	39.4	45.6	50.5	56.2	60.2	60.4	63.3	68.4	74.5	74.6	77.6	79.4	83.1	85.0	90.9	92.0	97.7
Petroleum refining	8.7	9.6	10.8	11.7	12.4	13.4	13.1	13.4	14.1	14.1	14.6	14.3	14.4	14.6	14.9	14.1	13.9
Rubber	5.2	5.7	6.2	6.8	6.9	7.0	7.3	7.7	7.8	8.0	8.3	8.7	8.7	9.4	9.7	10.4	11.2
Stone, clay, and glass	5.2	5.8	6.2	6.5	6.7	7.1	7.8	8.2	8.6	9.0	9.5	9.7	10.0	10.1	9.9	9.9	10.6
Primary metals	15.6	17.5	19.1	20.7	21.2	20.3	22.4	24.9	25.7	26.7	28.2	30.4	30.3	28.8	27.2	27.3	27.7
Fabricated metals	15.5	17.8	19.0	20.3	20.5	21.1	22.7	24.2	24.3	24.5	25.4	26.1	26.0	27.0	27.4	28.8	30.2
Machinery	33.6	37.9	43.0	45.5	47.5	47.5	50.0	55.9	56.5	59.1	62.7	67.2	70.5	75.4	79.8	80.0	81.6
Electrical equipment	44.2	47.7	56.4	65.5	71.6	73.7	81.0	95.7	106.0	107.3	117.4	126.9	132.2	144.3	139.3	140.5	144.5
Motor vehicles	12.9	13.6	13.8	14.1	14.5	14.6	15.2	15.0	15.5	15.6	16.3	16.5	16.7	18.0	20.0	21.7	23.6
Aircraft	17.6	22.4	37.7	50.0	55.7	58.8	65.4	77.8	74.6	78.0	76.3	74.1	77.9	83.0	80.9	82.4	83.3
Other transportation equipment	2.8	2.9	3.3	3.7	3.6	3.3	3.7	4.3	4.7	4.7	4.9	4.8	4.8	5.0	4.9	5.1	5.5
Professional and scientific instruments	10.5	12.2	14.1	15.6	17.1	17.4	18.6	20.7	22.0	24.1	26.9	28.7	30.5	31.5	31.4	33.3	35.6
Miscellaneous manufacturing	5.0	5.1	5.3	5.5	5.6	5.7	5.9	6.0	6.1	6.2	6.3	6.3	6.5	6.7	6.6	6.6	6.7
Nonmanufacturing	152.5	165.0	175.0	188.2	198.5	212.6	231.2	244.3	249.6	259.6	264.5	268.5	279.5	291.1	307.2	314.5	328.8
Mining	18.6	18.6	19.5	22.1	23.0	24.2	25.8	28.7	29.7	29.7	28.2	28.3	27.5	28.8	28.6	29.1	29.4
Petroleum extraction	12.8	12.7	13.4	15.7	16.9	18.2	19.7	22.3	22.8	22.7	21.5	21.5	21.1	22.0	22.0	22.3	22.1
Other mining	5.8	5.9	6.1	6.4	6.1	6.0	6.1	6.4	6.9	7.0	6.7	6.8	6.4	6.8	6.6	6.8	7.3
Construction	24.6	29.3	31.4	33.5	33.8	37.3	39.5	41.0	42.1	43.6	45.0	45.6	46.9	48.2	47.4	47.1	51.6
Transportation, communications, and public utilities	27.4	29.3	30.2	32.4	35.0	38.2	39.6	41.7	43.1	44.1	45.1	46.8	48.3	48.5	50.5	53.6	54.5
Railroads	5.4	5.5	5.6	5.6	5.5	5.4	5.5	5.5	5.3	5.2	5.1	4.9	4.8	4.6	4.9	4.5	4.5
Other transportation	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.6	4.7	5.1	5.1	4.9	5.1	5.4	5.4
Telecommunications	6.3	6.6	7.2	7.7	8.0	8.2	8.6	8.9	8.9	9.1	9.2	9.4	9.7	9.8	10.5	11.9	12.2
Radio and TV	1.5	1.8	1.9	1.9	2.5	3.8	4.0	4.1	4.3	4.4	4.4	4.5	4.5	4.5	4.7	5.1	5.1
Public utilities	10.7	11.8	11.8	13.4	15.1	16.8	17.4	19.0	20.3	20.8	21.7	22.9	24.2	24.7	25.3	26.7	27.3
Other industries	81.9	87.8	93.9	100.2	106.7	112.9	126.3	132.9	134.7	142.2	146.2	147.8	156.8	165.6	180.7	184.7	193.3
Miscellaneous business services	23.1	24.5	25.8	27.2	28.6	29.9	32.4	34.9	37.4	41.9	44.3	46.2	49.0	53.2	55.9	55.1	57.0
Medical and dental laboratories	.6	.6	.7	.7	.8	.8	.8	.9	.9	.9	1.0	1.0	1.1	1.1	1.2	1.3	1.4
Engineering and architectural services	41.4	45.4	49.4	53.5	57.5	61.4	71.0	74.6	73.1	74.8	75.6	74.4	77.3	79.7	87.8	89.3	93.0
Other nonmanufacturing	16.8	17.3	18.0	18.8	19.8	20.8	22.1	22.5	23.3	24.6	25.3	26.2	30.4	31.6	35.8	39.0	41.9
Government	106.4	119.5	132.1	135.3	132.9	135.7	142.4	151.3	155.4	165.1	168.5	176.6	188.4	199.5	206.9	215.3	219.5
Federal	59.6	70.7	82.2	84.9	79.7	81.5	85.4	90.1	91.7	97.7	97.9	102.2	110.6	120.3	126.4	132.1	134.1
State	26.4	27.8	29.5	29.4	31.5	31.5	33.4	35.3	36.7	39.4	42.0	44.8	47.4	47.9	48.6	50.4	51.7
Local	20.4	21.0	20.4	21.0	21.7	22.7	23.6	25.9	27.0	28.0	28.6	29.6	30.4	31.3	31.9	32.8	33.7
Universities and colleges	50.7	49.6	49.8	51.7	56.3	61.8	70.0	82.3	96.3	107.8	115.9	123.9	132.5	143.5	160.5	171.1	180.7
Nonprofit institutions	3.2	3.3	3.8	4.2	4.4	5.0	5.0	5.8	6.2	7.0	7.7	8.9	11.1	13.1	13.5	14.0	14.7

(Percent distribution)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Private industry	71.0	71.5	72.6	74.3	75.1	74.8	75.0	74.9	74.1	73.3	73.4	73.1	72.4	72.2	71.2	70.6	70.7
Manufacturing	43.2	44.3	46.9	48.9	49.5	48.5	48.3	49.2	49.0	48.7	49.3	49.6	49.2	49.2	47.9	47.5	47.3
Ordnance	.4	.5	1.5	2.2	2.1	1.8	1.7	1.9	1.8	2.8	3.1	3.6	3.9	4.2	4.1	4.3	4.2
Food	1.5	1.5	1.4	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.1	1.0	.9	.9	.8
Textiles and apparel	.6	.6	.5	.5	.5	.5	.4	.4	.4	.4	.4	.3	.3	.3	.4	.4	.5
Lumber and furniture	.4	.4	.4	.4	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3
Paper	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0
Chemicals	7.2	7.5	7.4	7.6	7.8	7.5	7.3	7.2	7.5	7.1	7.1	6.9	6.9	6.7	6.9	6.8	6.9
Petroleum refining	1.6	1.6	1.6	1.6	1.6	1.7	1.5	1.4	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1.0	1.0
Rubber	.9	.9	.9	.9	.9	.9	.8	.8	.8	.8	.8	.8	.7	.7	.7	.8	.8
Stone, clay, and glass	.9	1.0	.9	.9	.9	.9	.9	.9	.9	.9	.9	.8	.8	.8	.7	.7	.8
Primary metals	2.8	2.9	2.8	2.8	2.7	2.5	2.6	2.6	2.6	2.5	2.6	2.7	2.5	2.3	2.1	2.0	2.0
Fabricated metals	2.8	2.9	2.8	2.7	2.6	2.6	2.6	2.5	2.4	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.1
Machinery	6.1	6.3	6.3	6.1	6.1	5.9	5.8	5.9	5.7	5.6	5.7	5.9	5.9	5.9	6.0	5.9	5.8
Electrical equipment	8.0	7.9	8.3	8.8	9.2	9.1	9.3	10.0	10.7	10.2	10.7	11.1	11.0	11.3	10.6	10.3	10.2
Motor vehicles	2.3	2.2	2.0	1.9	1.9	1.8	1.8	1.6	1.6	1.5	1.5	1.4	1.4	1.4	1.5	1.6	1.7
Aircraft	3.2	3.7	5.5	6.7	7.2	7.3	7.5	8.2	7.5	7.4	7.0	6.5	6.5	6.5	6.1	6.1	5.9
Other transportation equipment	.5	.5	.5	.5	.5	.4	.4	.5	.5	.4	.4	.4	.4	.4	.4	.4	.4
Professional and scientific instruments	1.9	2.0	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.3	2.5	2.5	2.5	2.5	2.4	2.4	2.5
Miscellaneous manufacturing	.9	.8	.8	.7	.7	.7	.7	.6	.6	.6	.6	.6	.5	.5	.5	.5	.5
Nonmanufacturing	27.8	27.2	25.7	25.4	25.6	26.3	26.7	25.7	25.1	24.6	24.1	23.5	23.2	23.0	23.3	23.1	23.4
Mining	3.4	3.1	2.9	3.0	3.0	3.0	3.0	3.0	3.0	2.8	–2.6	2.5	2.3	2.3	2.2	2.1	2.1
Petroleum extraction	2.3	2.1	2.0	2.1	2.2	2.3	2.3	2.3	2.3	2.2	2.0	1.9	1.8	1.7	1.7	1.6	1.6
Other mining	1.1	1.0	.9	.9	.8	.7	.7	.7	.7	.7	.6	.6	.5	.5	.5	.5	.5
Construction	4.5	4.8	4.6	4.5	4.4	4.6	4.6	4.3	4.2	4.1	4.1	4.0	3.9	3.8	3.6	3.5	3.7
Transportation, communications, and public utilities	5.0	4.8	4.4	4.4	4.5	4.7	4.6	4.4	4.3	4.2	4.1	4.1	4.0	3.8	3.8	3.9	3.9
Railroads	1.0	.9	.8	.8	.7	.7	.6	.6	.5	.5	.5	.4	.4	.4	.4	.3	.3
Other transportation	.6	.6	.5	.5	.5	.5	.5	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
Telecommunications	1.1	1.1	1.1	1.0	1.0	1.0	1.0	.9	.9	.9	.8	.8	.8	.8	.8	.9	.9
Radio and TV	.3	.3	.3	.3	.3	.5	.5	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
Public utilities	1.9	1.9	1.7	1.8	1.9	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	1.9
Other industries	14.9	14.5	13.8	13.5	13.7	14.0	14.5	14.0	13.6	13.5	13.3	12.9	13.0	13.1	13.7	13.6	13.7
Miscellaneous business services	4.2	4.0	3.8	3.7	3.7	3.7	3.7	3.7	3.8	4.0	4.0	4.0	4.0	4.2	4.2	4.0	4.0
Medical and dental laboratories	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
Engineering and architectural services	7.5	7.5	7.3	7.2	7.4	7.6	8.2	7.8	7.3	7.1	6.9	6.5	6.4	6.3	6.7	6.6	6.6
Other nonmanufacturing	3.1	2.9	2.6	2.5	2.5	2.6	2.5	2.4	2.3	2.3	2.3	2.3	2.5	2.5	2.7	2.9	3.0
Government	19.3	19.7	19.4	18.2	17.1	16.8	16.4	15.9	15.6	15.7	15.4	15.4	15.6	15.7	15.7	15.8	15.5
Federal	10.8	11.7	12.1	11.4	10.3	10.1	9.9	9.5	9.2	8.9	8.9	8.9	9.2	9.4	9.6	9.7	9.5
State	4.8	4.6	4.3	4.0	4.1	3.9	3.9	3.7	3.7	3.7	3.8	3.9	3.9	3.8	3.7	3.7	3.7
Local	3.7	3.5	3.0	2.8	2.8	2.8	2.7	2.7	2.7	2.7	2.6	2.6	2.5	2.5	2.4	2.4	2.4
Universities and colleges	9.2	8.2	7.3	7.0	7.2	7.7	8.1	8.6	9.7	10.3	10.6	10.8	11.0	11.3	12.2	12.6	12.8
Nonprofit institutions	.6	.5	.6	.6	.6	.6	.6	.6	.6	.7	.7	.8	.9	1.0	1.0	1.0	1.0

Note: Detail may not add to totals because of rounding. Source: Bureau of Labor Statistics.

TABLE A-2. ESTIMATED EMPLOYMENT OF SCIENTISTS AND ENGINEERS ENGAGED IN RESEARCH AND DEVELOPMENT, BY SECTOR, 1950-66

(In thousands)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	152.2	169.3	198.6	221.5	237.1	243.0	265.1	302.3	323.3	354.2	379.5	402.8	435.5	471.2	490.5	503.7	520.5
Private industry	99.3	112.3	135.3	156.6	169.8	177.1	194.6	224.4	238.4	260.1	279.5	294.5	317.5	344.1	350.0	357.0	370.9
Manufacturing	79.6	91.0	112.2	131.4	142.5	147.7	161.7	188.2	200.1	218.2	235.2	248.6	268.4	289.2	293.4	295.3	305.0
Ordnance	.6	.8	2.9	4.7	4.8	4.7	4.8	7.6	8.1	16.2	19.2	23.2	27.4	31.0	33.2	36.6	37.4
Food	2.3	2.6	2.7	2.9	3.0	3.1	3.2	3.4	3.5	3.7	3.9	4.1	4.0	3.9	3.9	4.0	4.0
Textiles and apparel	.7	.8	.8	.9	.9	.9	1.0	1.0	1.0	1.0	1.1	1.0	1.1	1.1	1.4	1.6	1.8
Lumber and furniture	.2	.2	.2	.2	.3	.3	.3	.3	.4	.4	.4	.4	.4	.4	.5	.6	.7
Paper	1.2	1.4	1.6	1.7	1.8	2.0	2.3	2.4	2.6	2.8	3.0	3.2	3.4	3.5	3.5	3.8	4.1
Chemicals	13.1	15.4	17.3	19.5	21.2	21.9	23.5	26.1	29.4	30.4	32.4	34.0	36.9	39.1	40.7	40.4	43.0
Petroleum refining	1.8	2.0	2.3	2.5	2.7	2.9	2.9	2.9	3.1	3.1	3.3	3.2	3.5	3.7	3.8	3.7	3.6
Rubber	2.4	2.6	2.8	3.0	3.0	3.0	3.1	3.3	3.3	3.3	3.4	3.4	3.4	3.7	3.7	4.3	4.9
Stone, clay, and glass	1.0	1.2	1.4	1.5	1.6	1.7	2.0	2.2	2.3	2.5	2.8	2.9	3.1	3.2	2.8	3.0	3.2
Primary metals	2.0	2.3	2.6	2.8	2.9	2.9	3.4	4.0	4.3	4.6	4.9	5.5	5.1	4.5	4.4	5.0	5.1
Fabricated metals	3.6	4.1	4.4	4.8	4.9	5.1	5.6	6.0	6.1	6.2	6.5	6.7	6.8	7.1	7.1	7.2	7.4
Machinery	11.4	12.9	14.8	15.7	16.5	16.7	17.6	19.8	20.2	21.2	22.6	24.4	26.4	29.0	31.0	31.2	32.3
Electrical equipment	19.0	20.6	24.5	28.7	31.7	32.8	36.3	43.2	50.5	53.7	61.2	65.7	72.9	81.9	78.4	73.6	75.7
Motor vehicles	3.7	4.0	4.1	4.2	4.4	4.5	4.9	4.9	5.1	5.3	5.8	5.9	6.4	7.0	7.7	8.5	9.3
Aircraft	9.3	12.0	20.6	28.1	32.0	34.2	39.0	48.2	46.5	49.1	48.5	47.4	50.3	53.8	52.8	52.9	53.0
Other transportation equipment	.8	.9	1.0	1.1	1.1	1.0	1.1	1.3	1.4	1.4	1.5	1.5	1.5	1.6	1.6	1.7	2.1
Professional and scientific instruments	4.9	5.6	6.5	7.3	7.9	8.1	8.7	9.6	10.2	11.2	12.5	14.0	13.6	12.6	14.8	14.8	14.8
Miscellaneous manufacturing	1.6	1.6	1.7	1.8	1.8	1.9	2.0	2.0	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.4	2.6
Nonmanufacturing	19.7	21.3	23.1	25.2	27.3	29.4	32.9	36.2	38.3	41.9	44.3	45.9	49.1	54.9	56.6	61.7	65.9
Mining	1.5	1.5	1.6	1.8	2.0	2.1	2.2	2.6	2.7	2.7	2.6	2.6	2.8	2.9	2.8	2.7	2.6
Petroleum extraction	1.0	1.0	1.1	1.3	1.5	1.6	1.7	2.0	2.1	2.1	2.0	2.0	2.2	2.2	2.1	1.9	1.7
Other mining	.5	.5	.5	.5	.5	.5	.5	.6	.6	.6	.6	.6	.6	.7	.7	.8	.9
Construction	.2	.2	.3	.3	.3	.4	.4	.5	.5	.5	.6	.5	.6	.7	.8	.8	.8
Transportation, communications, and public utilities	.9	.9	.9	1.0	1.2	1.3	1.4	1.5	1.5	1.5	1.5	1.6	1.6	1.8	2.0	2.2	2.2
Railroads	.1	.1	.1	.1	.1	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
Other transportation	.3	.3	.3	.3	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.6	.6	.5
Telecommunications	.2	.2	.2	.2	.2	.2	.3	.3	.3	.3	.3	.3	.3	.3	.3	.5	.6
Radio and TV	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	.1	.1	.1
Public utilities	.3	.3	.3	.4	.5	.5	.5	.6	.6	.6	.6	.7	.7	.8	.8	.8	.8
Other industries	17.1	18.7	20.3	22.1	23.8	25.6	28.9	31.6	33.6	37.2	39.6	41.2	44.1	49.5	51.0	56.0	60.3
Miscellaneous business services	11.6	12.5	13.4	14.4	15.4	16.4	18.1	19.9	21.7	24.7	26.6	27.9	29.8	34.2	34.5	38.9	42.3
Medical and dental laboratories	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.2
Engineering and architectural services	4.4	5.0	5.7	6.4	7.0	7.7	9.2	10.0	10.1	10.6	11.0	11.2	11.9	12.5	13.4	13.7	14.0
Other nonmanufacturing	1.0	1.1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.3	2.7	3.0	3.3	3.8
Government	27.2	30.5	33.6	32.7	32.3	27.8	30.4	34.0	36.6	42.0	44.7	48.1	53.1	56.3	66.2	70.0	71.2
Federal	25.3	28.5	31.5	30.6	30.1	25.5	28.0	31.4	33.8	38.9	41.3	44.3	49.0	52.1	62.0	65.7	66.8
State	1.3	1.4	1.5	1.5	1.6	1.6	1.7	1.8	1.9	2.2	2.5	2.8	3.1	3.1	3.1	3.2	3.3
Local	.6	.6	.6	.6	.6	.7	.7	.8	.9	.9	.9	1.0	1.0	1.1	1.1	1.1	1.1
Universities and colleges	22.9	23.6	26.3	28.6	31.1	33.8	35.7	38.8	42.9	46.0	48.6	52.4	55.2	59.3	62.5	64.5	65.6
Nonprofit institutions	2.8	2.9	3.4	3.6	3.9	4.3	4.4	5.1	5.4	6.1	6.7	7.8	9.7	11.5	11.8	12.2	12.8

(Percent distribution)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Private industry	65.3	66.4	68.2	70.7	71.6	72.9	73.4	74.3	73.8	73.4	73.7	73.1	72.9	73.0	71.4	70.8	71.2
Manufacturing	52.3	53.8	56.5	59.3	60.1	60.8	61.0	62.3	61.9	61.6	62.0	61.7	61.6	61.4	59.8	58.6	58.6
Ordnance	.4	.5	1.5	2.1	2.0	1.9	1.8	2.5	2.5	4.6	5.1	5.8	6.3	6.6	6.8	7.3	7.2
Food	1.5	1.5	1.4	1.3	1.3	1.3	1.2	1.1	1.1	1.0	1.0	1.0	.9	.8	.8	.8	.8
Textiles and apparel	.5	.5	.4	.4	.4	.4	.4	.3	.3	.3	.3	.2	.3	.2	.3	.3	.3
Lumber and furniture	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
Paper	.8	.8	.8	.8	.8	.8	.9	.8	.8	.8	.8	.8	.8	.7	.7	.8	.8
Chemicals	8.6	9.1	8.7	8.8	8.9	9.0	8.9	8.6	9.1	8.6	8.5	8.4	8.5	8.3	8.3	8.0	8.3
Petroleum refining	1.2	1.2	1.2	1.1	1.1	1.2	1.1	1.0	1.0	.9	.9	.8	.8	.8	.8	.7	.7
Rubber	1.6	1.5	1.4	1.4	1.3	1.2	1.2	1.1	1.0	.9	.9	.8	.8	.8	.8	.9	.9
Stone, clay, and glass	.7	.7	.7	.7	.7	.7	.8	.7	.7	.7	.7	.7	.7	.7	.6	.6	.6
Primary metals	1.3	1.4	1.3	1.3	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.4	1.2	1.0	.9	1.0	1.0
Fabricated metals	2.4	2.4	2.2	2.2	2.1	2.1	2.1	2.0	1.9	1.8	1.7	1.7	1.6	1.5	1.4	1.4	1.4
Machinery	7.5	7.6	7.5	7.1	7.0	6.9	6.6	6.5	6.2	6.0	6.0	6.1	6.1	6.2	6.3	6.2	6.2
Electrical equipment	12.5	12.2	12.3	13.0	13.4	13.5	13.7	14.3	15.6	15.2	16.1	16.3	16.7	17.4	16.0	14.6	14.5
Motor vehicles	2.4	2.4	2.1	1.9	1.9	1.9	1.8	1.6	1.6	1.5	1.5	1.5	1.5	1.5	1.6	1.7	1.8
Aircraft	6.1	7.1	10.4	12.7	13.5	14.1	14.7	15.9	14.4	13.9	12.8	11.8	11.5	11.4	10.8	10.5	10.2
Other transportation equipment	.5	.5	.5	.5	.5	.4	.4	.4	.4	.4	.4	.4	.3	.3	.3	.3	.4
Professional and scientific instruments	3.2	3.3	3.3	3.3	3.3	3.3	3.3	3.2	3.2	3.2	3.3	3.5	3.1	2.7	3.0	2.9	2.8
Miscellaneous manufacturing	1.1	.9	.9	.8	.8	.8	.8	.7	.6	.6	.6	.5	.5	.4	.4	.5	.5
Nonmanufacturing	13.0	12.6	11.7	11.4	11.5	12.1	12.4	12.0	11.9	11.8	11.7	11.4	11.3	11.6	11.6	12.2	12.6
Mining	1.0	.9	.8	.8	.8	.9	.8	.9	.8	.8	.7	.6	.6	.6	.6	.5	.5
Petroleum extraction	.7	.6	.6	.6	.6	.7	.6	.7	.6	.6	.5	.5	.5	.5	.4	.4	.3
Other mining	.3	.3	.3	.2	.2	.2	.2	.2	.2	.2	.2	.1	.1	.1	.1	.2	.2
Construction	.1	.1	.2	.1	.1	.2	.2	.2	.2	.1	.2	.1	.1	.1	.2	.2	.2
Transportation, communications, and public utilities	.6	.5	.5	.5	.5	.5	.5	.5	.5	.4	.4	.4	.4	.4	.4	.4	.4
Railroads	.1	.1	.1	(a)	(a)	.1	.1	.1	.1	.1	.1	(a)	(a)	(a)	(a)	(a)	(a)
Other transportation	.2	.2	.2	.1	.2	.2	.2	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
Telecommunications	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
Radio and TV	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Public utilities	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
Other industries	11.3	11.1	10.2	10.0	10.1	10.5	10.9	10.4	10.4	10.5	10.4	10.3	10.2	10.5	10.4	11.1	11.5
Miscellaneous business services	7.6	7.4	6.7	6.5	6.5	6.7	6.8	6.6	6.7	7.0	7.0	6.9	6.8	7.3	7.0	7.7	8.1
Medical and dental laboratories	.1	.1	.1	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Engineering and architectural services	2.9	3.0	2.9	2.9	3.0	3.2	3.5	3.3	3.1	3.0	2.9	2.8	2.8	2.7	2.7	2.7	2.7
Other nonmanufacturing	.7	.6	.6	.5	.5	.6	.6	.5	.5	.5	.5	.5	.5	.6	.6	.7	.7
Government	17.9	18.0	16.9	14.8	13.6	11.4	11.5	11.2	11.3	11.9	11.8	11.9	12.2	11.9	13.5	13.9	13.7
Federal	16.6	16.8	15.9	13.8	12.7	10.5	10.6	10.4	10.5	11.0	10.9	11.0	11.3	11.1	12.6	13.0	12.8
State	.9	.8	.8	.7	.7	.7	.6	.6	.6	.6	.7	.7	.7	.7	.6	.6	.6
Local	.4	.4	.3	.3	.3	.3	.3	.3	.3	.3	.2	.2	.2	.2	.2	.2	.2
Universities and colleges	15.0	13.9	13.2	12.9	13.1	13.9	13.5	12.8	13.3	13.0	12.8	13.0	12.7	12.6	12.7	12.8	12.5
Nonprofit institutions	1.8	1.7	1.7	1.6	1.6	1.8	1.7	1.7	1.7	1.7	1.8	1.9	2.2	2.4	2.4	2.4	2.6

[a] Less than 50 and 0.05 percent. Note: Detail may not add to totals because of rounding. Source: Bureau of Labor Statistics.

TABLE A-3. ESTIMATED EMPLOYMENT OF ENGINEERS, BY SECTOR, 1950-66

(In thousands)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	404.6	447.0	503.7	552.2	577.0	597.8	642.4	703.8	726.1	763.8	796.7	828.5	869.4	918.3	941.3	965.8	996.0
Private industry	317.1	352.1	402.3	449.5	475.1	492.9	531.7	584.4	601.6	630.3	658.7	682.7	713.0	753.0	768.3	785.8	812.2
Manufacturing	187.6	210.6	252.4	288.5	305.7	310.7	333.0	375.1	388.4	409.3	433.0	454.3	475.6	506.4	509.3	521.7	538.1
Ordnance	1.9	2.8	9.6	14.8	14.7	13.5	13.3	16.4	16.2	26.3	30.4	36.2	41.1	46.2	47.4	50.6	51.5
Food	3.6	4.0	4.2	4.3	4.6	4.7	4.9	5.0	5.2	5.5	5.7	5.9	5.6	5.7	4.9	4.9	5.0
Textiles and apparel	2.2	2.4	2.5	2.6	2.6	2.7	2.7	2.8	2.8	2.8	2.9	2.7	2.8	3.0	3.4	3.5	3.8
Lumber and furniture	2.0	2.3	2.4	2.5	2.5	2.5	2.7	2.7	2.7	2.8	2.9	3.0	3.0	3.0	3.1	3.3	3.6
Paper	4.3	4.9	5.3	5.7	5.9	6.4	7.0	7.4	7.7	7.9	8.4	9.1	9.7	9.7	9.5	9.9	10.1
Chemicals	19.7	21.7	22.9	25.6	26.8	26.6	27.5	29.6	31.8	31.4	32.0	32.2	33.2	34.6	39.4	38.6	40.6
Petroleum refining	6.1	6.7	7.6	8.2	8.8	9.1	9.3	9.4	9.9	9.9	10.3	10.0	10.1	10.3	10.5	10.1	9.9
Rubber	3.4	3.7	4.1	4.5	4.6	4.7	4.9	5.2	5.3	5.5	5.8	6.0	6.0	6.3	6.7	7.3	7.9
Stone, clay, and glass	4.2	4.7	5.1	5.3	5.5	5.9	6.4	6.8	7.1	7.5	8.0	8.1	8.4	8.5	8.3	8.4	8.9
Primary metals	11.2	12.6	13.7	14.8	15.1	14.4	15.8	17.6	18.1	18.6	19.6	20.5	21.1	20.3	19.4	20.0	20.5
Fabricated metals	14.2	16.3	17.4	18.6	18.8	19.3	20.8	22.1	22.2	22.4	23.2	23.9	23.9	24.7	24.8	26.2	27.9
Machinery	31.3	35.3	40.0	42.3	44.2	44.2	46.4	51.9	52.5	54.9	58.1	62.3	65.3	69.9	73.3	73.5	75.1
Electrical equipment	40.5	43.7	51.8	60.3	66.1	68.1	75.0	88.8	98.5	99.9	109.7	118.6	123.6	134.8	130.5	132.2	135.6
Motor vehicles	11.8	12.5	12.7	13.0	13.3	13.4	13.9	13.7	14.2	14.3	14.9	15.1	15.3	16.4	18.1	20.0	21.9
Aircraft	16.0	20.3	34.2	45.2	50.2	52.8	58.6	69.5	66.4	69.8	68.7	67.1	71.1	76.1	73.9	75.5	76.2
Other transportation equipment	2.7	2.7	3.1	3.5	3.4	3.1	3.5	4.1	4.5	4.5	4.7	4.6	4.6	4.8	4.7	4.9	5.2
Professional and scientific instruments	8.7	10.1	11.7	13.1	14.3	14.6	15.7	17.4	18.5	20.4	22.7	24.3	25.9	26.9	26.6	27.9	29.6
Miscellaneous manufacturing	3.8	3.9	4.1	4.2	4.3	4.4	4.6	4.7	4.8	4.9	5.0	4.7	4.9	5.2	4.8	4.9	4.8
Nonmanufacturing	129.5	141.5	149.9	161.0	169.4	182.2	198.7	209.3	213.2	221.0	225.7	228.4	237.4	246.6	259.0	263.8	274.1
Mining	10.5	10.7	11.2	12.6	13.1	13.6	14.9	16.7	17.5	17.4	17.0	17.3	16.6	18.0	17.6	17.4	17.2
Petroleum extraction	6.0	6.1	6.5	7.7	8.4	9.1	10.3	11.9	12.4	12.3	12.1	12.5	12.1	13.2	13.0	12.2	11.7
Other mining	4.5	4.6	4.7	4.9	4.7	4.5	4.6	4.8	5.1	5.1	4.9	4.9	4.5	4.8	4.6	5.2	5.6
Construction	24.4	29.1	31.2	33.3	33.6	37.1	39.3	40.8	41.9	43.3	44.7	45.3	46.6	47.9	47.1	46.7	51.1
Transportation, communications, and public utilities	26.4	28.3	29.1	31.2	33.6	36.9	38.1	40.1	41.5	42.5	43.5	45.3	46.8	46.8	48.7	51.7	52.4
Railroads	5.1	5.2	5.2	5.2	5.1	5.1	5.1	5.0	4.9	4.8	4.8	4.7	4.6	4.3	4.6	4.1	4.0
Other transportation	3.4	3.5	3.6	3.7	3.7	3.8	3.9	4.0	4.1	4.4	4.5	4.9	4.9	4.7	4.9	5.3	5.3
Telecommunications	6.2	6.5	7.1	7.6	7.9	8.1	8.5	8.8	8.8	9.0	9.1	9.3	9.6	9.7	10.4	11.7	12.0
Radio and TV	1.5	1.8	1.9	1.9	2.5	3.8	4.0	4.1	4.3	4.4	4.4	4.5	4.5	4.5	4.7	5.1	5.1
Public utilities	10.2	11.3	11.3	12.8	14.4	16.1	16.6	18.2	19.4	19.9	20.7	21.9	23.2	23.6	24.1	25.5	26.0
Other industries	68.2	73.4	78.4	83.9	89.1	94.6	106.4	111.7	112.3	117.8	120.5	120.5	127.4	133.9	145.6	148.0	153.4
Miscellaneous business services	16.2	17.2	17.9	18.9	19.7	20.6	22.2	23.9	25.4	28.5	29.9	30.5	31.3	34.8	36.2	34.7	35.4
Medical and dental laboratories	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Engineering and architectural services	40.5	44.4	48.2	52.2	56.0	59.8	69.1	72.5	71.1	72.7	73.5	72.3	75.0	77.4	84.7	87.1	90.1
Other nonmanufacturing	11.5	11.8	12.3	12.8	13.4	14.2	15.1	15.3	15.8	16.6	17.1	17.7	21.1	21.7	24.7	26.2	27.9
Government	75.4	83.1	89.9	90.7	88.9	90.5	94.6	100.6	103.5	110.0	112.5	118.4	126.6	133.0	137.4	142.5	144.1
Federal	38.8	45.1	51.3	51.8	48.0	48.8	50.9	53.6	54.7	58.5	58.6	61.8	67.5	73.0	76.4	79.7	80.1
State	18.9	19.9	21.1	21.0	22.5	22.5	23.9	25.2	26.2	28.2	30.1	32.1	34.0	34.2	34.5	35.5	36.0
Local	17.7	18.1	17.5	17.9	18.4	19.2	19.8	21.7	22.6	23.3	23.8	24.5	25.1	25.8	26.5	27.3	28.0
Universities and colleges	11.2	10.9	10.5	10.9	11.8	13.0	14.7	17.3	19.3	21.6	23.3	24.8	26.5	28.4	31.5	33.4	35.1
Nonprofit institutions	.9	.9	1.0	1.1	1.2	1.4	1.4	1.6	1.7	1.9	2.2	2.6	3.3	3.9	4.1	4.4	4.6

(Percent distribution)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Private industry	78.4	78.7	79.9	81.4	82.3	82.6	82.7	83.1	82.9	82.7	82.6	82.4	82.0	82.0	81.7	81.3	81.5
Manufacturing	46.4	47.1	50.1	52.2	53.0	52.0	51.8	53.3	53.5	53.6	54.3	54.8	54.7	55.1	54.1	54.0	54.0
Ordnance	.5	.6	1.9	2.7	2.5	2.3	2.1	2.3	2.2	3.4	3.8	4.4	4.7	5.0	5.0	5.2	5.2
Food	.9	.9	.8	.8	.8	.8	.8	.7	.7	.7	.7	.7	.6	.6	.5	.5	.5
Textiles and apparel	.5	.5	.5	.5	.5	.5	.4	.4	.4	.4	.4	.3	.3	.3	.4	.4	.4
Lumber and furniture	.5	.5	.5	.5	.4	.4	.4	.4	.4	.4	.4	.4	.3	.3	.3	.3	.4
Paper	1.1	1.1	1.1	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0
Chemicals	4.9	4.9	4.5	4.6	4.6	4.4	4.3	4.2	4.4	4.1	4.0	3.9	3.8	3.8	4.2	4.0	4.1
Petroleum refining	1.5	1.5	1.5	1.5	1.5	1.6	1.4	1.3	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1.0	1.0
Rubber	.8	.8	.8	.8	.8	.8	.8	.7	.7	.7	.7	.7	.7	.7	.7	.8	.8
Stone, clay, and glass	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	.9	.9	.9	.9
Primary metals	2.8	2.8	2.7	2.7	2.6	2.4	2.5	2.5	2.5	2.4	2.5	2.5	2.4	2.2	2.1	2.1	2.1
Fabricated metals	3.5	3.6	3.5	3.4	3.3	3.2	3.2	3.1	3.1	2.9	2.9	2.9	2.7	2.7	2.6	2.7	2.8
Machinery	7.7	7.9	7.9	7.7	7.7	7.4	7.2	7.4	7.2	7.2	7.3	7.5	7.5	7.6	7.8	7.6	7.5
Electrical equipment	10.0	9.8	10.3	10.9	11.5	11.4	11.7	12.6	13.6	13.1	13.8	14.3	14.2	14.7	13.9	13.7	13.6
Motor vehicles	2.9	2.8	2.5	2.4	2.3	2.2	2.2	1.9	2.0	1.9	1.9	1.8	1.8	1.8	1.9	2.1	2.2
Aircraft	4.0	4.5	6.8	8.2	8.7	8.8	9.1	9.9	9.1	9.1	8.6	8.1	8.2	8.3	7.9	7.8	7.7
Other transportation equipment	.7	.6	.6	.6	.6	.5	.5	.6	.6	.6	.6	.6	.5	.5	.5	.5	.5
Professional and scientific instruments	2.2	2.3	2.3	2.4	2.5	2.4	2.4	2.5	2.5	2.7	2.8	2.9	3.0	2.9	2.8	2.9	3.0
Miscellaneous manufacturing	.9	.9	.8	.8	.7	.7	.7	.7	.7	.6	.6	.6	.6	.6	.5	.5	.5
Nonmanufacturing	32.0	31.6	29.8	29.2	29.3	30.6	30.9	29.8	29.4	29.1	28.3	27.3	27.6	26.9	27.6	27.3	27.5
Mining	2.6	2.4	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.1	2.1	1.9	2.0	1.9	1.8	1.7
Petroleum extraction	1.5	1.4	1.3	1.4	1.5	1.5	1.6	1.7	1.7	1.6	1.5	1.5	1.4	1.4	1.4	1.3	1.2
Other mining	1.1	1.0	.9	.9	.8	.8	.7	.7	.7	.7	.6	.6	.5	.5	.5	.5	.6
Construction	6.0	6.5	6.2	6.0	5.8	6.2	6.1	5.8	5.8	5.7	5.6	5.4	5.4	5.2	5.0	4.8	5.1
Transportation, communications, and public utilities	6.5	6.3	5.8	5.7	5.8	6.2	5.9	5.7	5.7	5.6	5.5	5.5	5.4	5.1	5.2	5.4	5.3
Railroads	1.3	1.2	1.0	.9	.9	.9	.8	.7	.7	.6	.6	.6	.5	.5	.5	.4	.4
Other transportation	.8	.8	.7	.7	.6	.6	.6	.6	.6	.6	.6	.6	.6	.5	.5	.5	.5
Telecommunications	1.5	1.5	1.4	1.4	1.4	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.2	1.2
Radio and TV	.4	.4	.4	.3	.4	.6	.6	.6	.6	.6	.6	.5	.5	.5	.5	.5	.5
Public utilities	2.5	2.5	2.2	2.3	2.5	2.7	2.6	2.6	2.7	2.6	2.6	2.6	2.7	2.6	2.6	2.6	2.6
Other industries	16.9	16.4	15.6	15.2	15.4	15.9	16.6	15.9	15.5	15.5	15.1	14.6	14.6	14.6	15.5	15.3	15.4
Miscellaneous business services	4.0	3.8	3.6	3.4	3.4	3.4	3.5	3.4	3.5	3.7	3.8	3.7	3.6	3.8	3.8	3.6	3.6
Medical and dental laboratories	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Engineering and architectural services	10.0	9.9	9.6	9.5	9.7	10.0	10.8	10.3	9.8	9.5	9.2	8.7	8.6	8.4	9.0	9.0	9.0
Other nonmanufacturing	2.8	2.6	2.4	2.3	2.3	2.4	2.4	2.2	2.2	2.2	2.1	2.1	2.4	2.4	2.6	2.7	2.8
Government	18.6	18.6	17.8	16.4	15.4	15.1	14.7	14.3	14.3	14.4	14.1	14.3	14.6	14.5	14.6	14.8	14.5
Federal	9.6	10.1	10.2	9.4	8.3	8.2	7.9	7.6	7.5	7.7	7.4	7.5	7.8	7.9	8.1	8.3	8.0
State	4.7	4.5	4.2	3.8	3.9	3.8	3.7	3.6	3.6	3.7	3.8	3.0	3.9	3.7	3.7	3.7	3.6
Local	4.4	4.0	3.5	3.2	3.2	3.2	3.1	3.1	3.1	3.1	3.0	2.9	2.9	2.8	2.8	2.8	2.8
Universities and colleges	2.8	2.4	2.1	2.0	2.0	2.2	2.3	2.5	2.7	2.8	2.9	3.0	3.0	3.1	3.3	3.5	3.5
Nonprofit institutions	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.3	.3	.4	.4	.4	.5	.5

[a] Less than 50 and 0.05 percent. Note: Detail may not add to totals because of rounding. Source: Bureau of Labor Statistics.

TABLE A-4. ESTIMATED EMPLOYMENT OF SCIENTISTS, BY SECTOR, 1950-66

(In thousands)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	146.3	159.0	175.8	189.6	199.6	208.5	224.7	248.9	268.9	287.5	300.5	316.0	334.8	355.1	378.8	395.5	416.8
Private industry	73.5	81.5	81.5	101.2	107.9	110.9	117.9	128.9	135.5	141.2	146.3	152.4	159.2	164.3	170.9	175.3	185.5
Manufacturing	50.5	58.0	66.4	74.0	78.8	80.5	85.4	93.9	99.1	102.6	107.5	112.9	117.2	119.8	122.7	124.6	130.9
Ordnance	.2	.2	.8	1.4	1.4	1.3	1.3	1.8	1.7	3.1	3.8	4.5	6.1	6.7	7.2	7.9	8.4
Food	4.7	5.1	5.4	5.6	5.7	5.9	6.0	6.3	6.4	6.7	7.0	7.3	7.1	7.4	7.3	7.3	7.0
Textiles and apparel	.9	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.2	1.3	1.3	1.4	1.4	1.8	2.4	2.6
Lumber and furniture	.2	.2	.2	.2	.2	.2	.2	.3	.3	.4	.4	.4	.4	.4	.4	.4	.4
Paper	1.8	2.0	2.1	2.3	2.4	2.6	2.8	3.0	3.1	3.2	3.5	3.7	4.0	4.0	4.1	4.1	4.3
Chemicals	19.7	23.9	27.6	30.6	33.4	33.8	35.8	38.8	42.7	43.2	45.6	47.2	49.9	50.4	51.5	53.4	57.1
Petroleum refining	2.6	2.9	3.2	3.5	3.6	4.0	3.8	4.0	4.2	4.2	4.3	4.3	4.3	4.3	4.4	4.0	4.0
Rubber	1.9	2.0	2.1	2.3	2.3	2.3	2.4	2.5	2.5	2.5	2.5	2.7	2.7	3.1	3.0	3.1	3.4
Stone, clay, and glass	1.0	1.1	1.1	1.2	1.2	1.2	1.4	1.4	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.5	1.7
Primary metals	4.4	4.9	5.4	5.9	6.1	5.9	6.6	7.3	7.6	8.1	8.6	9.9	9.2	8.5	7.8	7.1	7.2
Fabricated metals	1.3	1.5	1.6	1.7	1.7	1.8	1.9	2.1	2.1	2.1	2.2	2.2	2.1	2.3	2.6	2.6	2.4
Machinery	2.3	2.6	3.0	3.1	3.3	3.3	3.5	4.0	4.0	4.3	4.5	4.9	5.2	5.5	6.5	6.5	6.5
Electrical equipment	3.7	4.0	4.6	5.2	5.5	5.6	6.0	6.9	7.5	7.4	7.7	8.3	8.6	9.5	8.8	8.3	8.9
Motor vehicles	1.1	1.1	1.1	1.1	1.2	1.2	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.6	1.9	1.7	1.7
Aircraft	1.6	2.1	3.5	4.8	5.5	6.0	6.8	8.3	8.2	8.2	7.6	7.0	6.8	6.9	7.0	6.9	7.1
Other transportation equipment	.1	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.3
Professional and scientific instruments	1.8	2.0	2.3	2.6	2.8	2.8	3.0	3.3	3.4	3.7	4.1	4.4	4.6	4.6	4.8	5.4	6.0
Miscellaneous manufacturing	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.6	1.6	1.5	1.8	1.7	1.9
Nonmanufacturing	23.0	23.5	25.1	27.2	29.1	30.4	32.5	35.0	36.4	38.6	38.8	39.5	42.0	44.5	48.2	50.7	54.6
Mining	8.1	7.9	8.3	9.5	9.9	10.6	10.9	12.0	12.2	12.3	11.2	10.9	10.9	10.8	11.0	11.7	12.1
Petroleum extraction	6.8	6.6	6.9	8.0	8.5	9.1	9.4	10.4	10.4	10.4	9.4	9.0	9.0	8.8	9.0	10.1	10.4
Other mining	1.3	1.3	1.4	1.5	1.4	1.5	1.5	1.6	1.8	1.9	1.8	1.9	1.9	2.0	2.0	1.6	1.7
Construction	.2	.2	.2	.2	.2	.2	.2	.2	.2	.3	.3	.3	.3	.3	.3	.4	.5
Transportation, communications, and public utilities	1.0	1.0	1.1	1.2	1.4	1.3	1.5	1.6	1.6	1.6	1.6	1.5	1.5	1.7	1.8	1.9	2.1
Railroads	.3	.3	.4	.4	.4	.3	.4	.5	.4	.4	.3	.2	.2	.3	.3	.4	.5
Other transportation	.1	.1	.1	.1	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.1	.1
Telecommunications	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.2	.2
Radio and TV	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Public utilities	.5	.5	.5	.6	.7	.7	.8	.8	.9	.9	1.0	1.0	1.0	1.1	1.2	1.2	1.3
Other industries	13.7	14.4	15.5	16.3	17.6	18.3	19.9	21.2	22.4	24.4	25.7	26.8	29.3	31.7	35.1	36.7	39.9
Miscellaneous business services	6.9	7.3	7.9	8.3	8.9	9.3	10.2	11.0	12.0	13.4	14.4	15.2	16.7	18.4	19.7	20.4	21.6
Medical and dental laboratories	.6	.6	.7	.7	.8	.8	.8	.9	.9	.9	1.0	1.0	1.1	1.1	1.2	1.3	1.4
Engineering and architectural services	.9	1.0	1.2	1.3	1.5	1.6	1.9	2.1	2.0	2.1	2.1	2.1	2.2	2.3	3.1	2.2	2.9
Other nonmanufacturing	5.3	5.5	5.7	6.0	6.4	6.6	7.0	7.2	7.5	8.0	8.2	8.5	9.3	9.9	11.1	12.8	14.0
Government	31.0	36.4	42.2	44.6	44.0	45.2	47.8	50.8	51.9	55.1	56.0	58.2	61.8	66.5	69.5	72.8	75.6
Federal	20.8	25.6	30.9	33.1	31.7	32.7	34.5	36.5	37.0	39.2	39.3	40.4	43.1	47.3	50.0	52.4	54.0
State	7.5	7.9	8.4	8.4	9.0	9.0	9.5	10.1	10.5	11.2	11.9	12.7	13.4	13.7	14.1	14.9	15.9
Local	2.7	2.9	2.9	3.1	3.3	3.5	3.8	4.2	4.4	4.7	4.8	5.1	5.3	5.5	5.4	5.5	5.7
Universities and colleges	39.5	38.7	39.3	40.8	44.5	48.8	55.3	65.0	77.0	86.2	92.7	99.1	106.0	115.1	129.0	137.7	145.6
Nonprofit institutions	2.3	2.4	2.8	3.0	3.2	3.6	3.7	4.2	4.5	5.0	5.5	6.3	7.8	9.2	9.4	9.7	10.1

(Percent distribution)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Private industry	50.1	51.3	52.0	53.3	54.1	53.2	52.6	51.3	50.4	49.2	47.8	48.2	47.6	46.2	45.1	44.3	44.5
Manufacturing	34.5	36.5	37.8	39.0	39.5	38.6	38.0	37.7	36.9	35.7	34.7	35.7	35.0	33.7	32.4	31.4	31.4
Ordnance	.1	.1	.5	.7	.7	.6	.6	.7	.6	1.1	1.3	1.4	1.8	1.9	1.9	2.0	2.0
Food	3.2	3.2	3.1	3.0	2.9	2.8	2.7	2.5	2.4	2.3	2.4	2.3	2.1	2.1	1.9	1.8	1.7
Textiles and apparel	.6	.6	.6	.5	.5	.5	.5	.4	.4	.4	.4	.4	.4	.4	.5	.6	.6
Lumber and furniture	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
Paper	1.2	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.2	1.2	1.2	1.1	1.1	1.0	1.0
Chemicals	13.5	15.0	15.7	16.1	16.7	16.2	15.9	15.6	15.9	15.0	15.4	14.9	14.9	14.2	13.6	13.4	13.7
Petroleum refining	1.8	1.8	1.8	1.8	1.8	1.9	1.7	1.6	1.6	1.5	1.5	1.4	1.3	1.2	1.2	1.0	1.0
Rubber	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.0	.9	.9	.8	.9	.8	.9	.8	.8	.8
Stone, clay, and glass	.7	.7	.6	.6	.6	.6	.6	.6	.6	.5	.5	.5	.5	.5	.4	.4	.4
Primary metals	3.0	3.1	3.1	3.1	3.1	2.8	2.9	2.9	2.8	2.8	2.9	3.1	2.7	2.4	2.1	1.8	1.7
Fabricated metals	.9	.9	.9	.9	.9	.9	.8	.8	.8	.7	.7	.7	.6	.6	.7	.7	.6
Machinery	1.6	1.6	1.7	1.6	1.7	1.6	1.6	1.6	1.5	1.5	1.5	1.6	1.6	1.5	1.7	1.6	1.6
Electrical equipment	2.5	2.5	2.6	2.7	2.8	2.7	2.7	2.8	2.8	2.6	2.6	2.6	2.6	2.7	2.3	2.1	2.1
Motor vehicles	.8	.7	.6	.6	.6	.6	.6	.5	.5	.5	.5	.4	.4	.5	.5	.4	.4
Aircraft	1.1	1.3	2.0	2.5	2.8	2.9	3.0	3.3	3.0	2.9	2.6	2.2	2.0	1.9	1.8	1.7	1.7
Other transportation equipment	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
Professional and scientific instruments	1.2	1.3	1.3	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.3	1.3	1.4	1.4
Miscellaneous manufacturing	.8	.8	.7	.7	.7	.6	.6	.5	.5	.5	.4	.5	.5	.4	.5	.4	.5
Nonmanufacturing	15.6	14.8	14.2	14.3	14.6	14.6	14.6	14.0	13.5	13.5	13.1	12.5	12.6	12.5	12.7	12.9	13.1
Mining	5.5	5.0	4.7	5.0	5.0	5.1	4.9	.8	4.5	4.3	3.8	3.4	3.3	3.0	2.9	3.0	2.9
Petroleum extraction	4.6	4.2	3.9	4.2	4.3	4.4	4.2	4.2	3.9	3.6	3.2	2.8	2.7	2.5	2.4	2.6	2.5
Other mining	.9	.8	.8	.8	.7	.7	.7	.6	.7	.7	.6	.6	.6	.6	.5	.4	.4
Construction	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
Transportation, communications, and public utilities	.7	.6	.6	.6	.7	.6	.7	.6	.6	.6	.5	.5	.4	.5	.5	.5	.5
Railroads	.2	.2	.2	.2	.2	.1	.2	.2	.1	.1	.1	.1	.1	.1	.1	.1	.1
Other transportation	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	(a)	(a)
Telecommunications	.1	.1	.1	.1	.1	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	(a)
Radio and TV	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Public utilities	.3	.3	.3	.3	.4	.3	.4	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3
Other industries	9.3	9.1	8.8	8.6	8.8	8.8	8.9	8.5	8.3	8.5	8.7	8.5	8.8	8.9	9.2	9.3	9.6
Miscellaneous business services	4.7	4.6	4.5	4.4	4.5	4.5	4.5	4.4	4.5	4.7	4.9	4.8	5.0	5.2	5.2	5.2	5.2
Medical and dental laboratories	.4	.4	.4	.4	.4	.4	.4	.4	.3	.3	.3	.3	.3	.3	.3	.3	.3
Engineering and architectural services	.6	.6	.7	.7	.8	.8	.8	.8	.7	.7	.7	.7	.7	.6	.8	.6	.7
Other nonmanufacturing	3.6	3.5	3.2	3.2	3.2	3.2	3.1	2.9	2.8	2.8	2.8	2.7	2.8	2.8	2.9	3.2	3.4
Government	21.2	22.9	24.0	23.5	22.0	21.7	21.3	20.4	19.3	19.2	19.0	18.4	18.5	18.7	18.3	18.4	18.1
Federal	14.2	16.1	17.6	17.5	15.9	15.7	15.4	14.7	13.8	13.6	13.3	12.8	12.9	13.3	13.2	13.3	13.0
State	5.1	5.0	4.8	4.4	4.5	4.3	4.2	4.1	3.9	3.9	4.0	4.0	4.0	3.9	3.7	3.8	3.8
Local	1.8	1.8	1.6	1.6	1.7	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.6	1.5	1.4	1.4	1.4
Universities and colleges	27.0	24.3	22.4	21.5	22.3	23.4	24.6	26.1	28.6	30.0	31.4	31.4	31.7	32.4	34.1	34.9	34.9
Nonprofit institutions	1.6	1.5	1.6	1.6	1.6	1.7	1.6	1.7	1.7	1.7	1.9	2.0	2.3	2.6	2.5	2.5	2.4

[a] Less than 50 and 0.05 percent.

Note: Detail may not add to totals because of rounding.

Source: Bureau of Labor Statistics.

TABLE A-5. ESTIMATED EMPLOYMENT OF CHEMISTS, BY SECTOR, 1950-66

(In thousands)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	51.2	56.1	62.1	66.8	70.5	72.8	78.1	83.3	89.3	94.3	98.4	101.6	105.6	108.7	113.5	116.0	119.3
Private industry	36.0	40.3	45.7	49.7	53.1	54.2	57.5	61.7	65.3	67.8	71.1	73.7	76.7	78.5	82.0	83.9	87.2
Manufacturing	30.5	34.7	39.7	43.4	46.4	47.3	49.9	53.7	56.7	58.4	61.3	63.4	65.6	66.9	68.7	70.4	73.7
Ordnance	(a)	(a)	.2	.2	.2	.2	.2	.3	.3	.5	.7	.8	.9	1.1	1.2	1.5	1.6
Food	2.9	3.2	3.3	3.5	3.6	3.6	3.7	3.9	4.1	4.2	4.4	4.6	4.5	4.6	4.5	4.5	4.4
Textiles and apparel	.9	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.2	1.3	1.3	1.3	1.3	1.7	1.9	2.1
Lumber and furniture	.1	.1	.1	.1	.1	.1	.1	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
Paper	1.5	1.7	1.8	1.9	2.0	2.1	2.3	2.5	2.5	2.6	2.8	3.0	3.0	3.0	3.1	2.9	2.8
Chemicals	13.4	15.8	18.8	21.0	23.3	23.7	25.1	27.0	29.2	30.1	32.0	33.1	35.3	35.3	36.3	37.8	40.3
Petroleum refining	2.3	2.5	2.8	3.1	3.3	3.5	3.5	3.5	3.7	3.7	3.9	3.8	3.8	3.8	3.9	3.4	3.3
Rubber	1.6	1.7	1.9	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.2	2.4	2.4	2.8	2.7	2.8	3.0
Stone, clay, and glass	.7	.8	.8	.9	.9	.9	1.0	1.0	1.1	1.1	1.1	1.2	1.2	1.2	1.1	1.1	1.2
Primary metals	2.0	2.2	2.4	2.5	2.5	2.3	2.4	2.6	2.6	2.6	2.7	2.9	2.7	2.5	2.3	2.2	2.2
Fabricated metals	.5	.6	.6	.6	.6	.7	.8	.8	.8	.8	.8	.8	.8	.9	1.1	1.1	.8
Machinery	.7	.8	.9	.9	.9	.9	1.0	1.1	1.1	1.1	1.2	1.3	1.2	1.4	1.7	1.7	1.7
Electrical equipment	1.1	1.2	1.3	1.5	1.6	1.6	1.7	1.9	2.1	2.1	2.1	2.2	2.4	2.7	2.4	2.1	2.2
Motor vehicles	.3	.3	.3	.3	.3	.3	.3	.3	.3	.4	.4	.4	.4	.5	.5	.6	.6
Aircraft	.4	.5	.9	1.2	1.3	1.5	1.7	2.1	2.1	2.1	1.8	1.6	1.5	1.4	1.4	1.4	1.5
Other transportation equipment	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
Professional and scientific instruments	1.0	1.1	1.4	1.5	1.6	1.6	1.7	1.9	2.0	2.2	2.4	2.4	2.6	2.7	3.0	3.7	4.1
Miscellaneous manufacturing	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.3	1.3	1.4	1.5	1.4	1.6
Nonmanufacturing	5.5	5.6	6.0	6.3	6.7	6.9	7.6	8.0	8.6	9.4	9.8	10.3	11.1	11.6	13.3	13.5	13.5
Mining	.5	.4	.5	.5	.5	.5	.6	.7	.7	.7	.7	.9	.9	.9	.9	.9	.9
Petroleum extraction	.1	.1	.1	.1	.1	.1	.1	.1	.1	.2	.1	.1	.1	.1	.2	.2	.2
Other mining	.4	.3	.4	.4	.4	.4	.5	.6	.6	.5	.6	.8	.8	.8	.7	.7	.7
Construction	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
Transportation, communications, and public utilities	.4	.4	.4	.4	.5	.5	.5	.6	.6	.6	.6	.6	.6	.6	.7	.7	.7
Railroads	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
Other transportation	(a)	(a)	(a)	(a)	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	(a)	(a)
Telecommunications	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Radio and TV	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Public utilities	.2	.2	.2	.2	.2	.2	.2	.3	.3	.3	.3	.3	.3	.3	.4	.5	.5
Other industries	4.5	4.7	5.0	5.3	5.6	5.8	6.4	6.6	7.2	8.0	8.4	8.7	9.5	10.0	11.6	11.8	11.8
Miscellaneous business services	2.8	2.9	3.2	3.3	3.4	3.6	4.0	4.1	4.6	5.3	5.6	5.8	6.3	6.5	7.3	7.3	7.0
Medical and dental laboratories	.1	.1	.1	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.3	.3	.3
Engineering and architectural services	.2	.2	.2	.2	.3	.3	.3	.4	.4	.4	.4	.4	.4	.4	.6	.3	.4
Other nonmanufacturing	1.4	1.5	1.5	1.6	1.7	1.7	1.9	1.9	2.0	2.1	2.2	2.3	2.6	2.9	3.4	3.9	4.1
Government	4.4	5.2	6.1	6.5	6.4	6.5	7.0	7.3	7.4	7.9	7.9	8.1	8.9	9.7	10.3	10.9	11.3
Federal	3.2	3.9	4.7	5.0	4.8	4.9	5.2	5.3	5.4	5.7	5.7	5.7	6.4	7.1	7.7	8.2	8.4
State	.8	.8	.9	.9	.9	.9	1.0	1.1	1.1	1.2	1.2	1.3	1.4	1.4	1.4	1.5	1.6
Local	.4	.5	.5	.6	.7	.7	.8	.9	.9	1.0	1.0	1.1	1.1	1.2	1.2	1.2	1.3
Universities and colleges	10.2	9.9	9.5	9.8	10.1	11.1	12.6	13.2	15.4	17.3	18.1	18.4	18.6	19.0	19.7	19.7	19.3
Nonprofit institutions	.6	.7	.8	.8	.9	1.0	1.0	1.1	1.2	1.3	1.3	1.4	1.4	1.5	1.5	1.5	1.5

(Percent distribution)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Private industry	70.4	71.9	73.5	74.3	75.2	74.4	73.6	74.0	73.2	71.9	72.3	72.5	72.7	72.2	72.2	72.4	73.1
Manufacturing	59.6	61.9	63.9	65.0	65.8	65.0	63.9	64.5	63.5	61.9	62.3	62.4	62.1	61.5	60.5	60.7	61.8
Ordnance	(a)	(a)	.3	.3	.3	.3	.3	.4	.3	.5	.7	.8	.9	1.0	1.1	1.3	1.3
Food	5.7	5.7	5.3	5.2	5.1	4.9	4.7	4.7	4.6	4.5	4.5	4.5	4.3	4.2	4.0	3.9	3.7
Textiles and apparel	1.8	1.8	1.6	1.5	1.4	1.5	1.4	1.3	1.2	1.3	1.3	1.3	1.2	1.2	1.5	1.6	1.8
Lumber and furniture	.2	.2	.2	.1	.1	.1	.1	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
Paper	2.9	3.0	2.9	2.8	2.8	2.9	2.9	3.0	2.8	2.8	2.8	3.0	2.8	2.8	2.7	2.5	2.3
Chemicals	26.2	28.2	30.3	31.4	33.0	32.6	32.1	32.4	32.7	31.9	32.5	32.6	33.4	32.5	32.0	32.6	33.8
Petroleum refining	4.5	4.5	4.5	4.6	4.7	4.8	4.5	4.2	4.1	3.9	4.0	3.7	3.6	3.5	3.4	2.9	2.8
Rubber	3.1	3.0	3.1	3.0	2.8	2.7	2.7	2.6	2.5	2.3	2.2	2.4	2.3	2.6	2.4	2.4	2.5
Stone, clay, and glass	1.4	1.4	1.3	1.3	1.3	1.2	1.3	1.2	1.2	1.2	1.1	1.2	1.1	1.1	1.0	.9	1.0
Primary metals	3.9	3.9	3.9	3.7	3.5	3.2	3.1	3.1	2.9	2.8	2.7	2.9	2.6	2.3	2.0	1.9	1.8
Fabricated metals	1.0	1.1	1.0	.9	.9	1.0	1.0	1.0	.9	.8	.8	.8	.8	.8	1.0	.9	.7
Machinery	1.4	1.4	1.4	1.3	1.3	1.2	1.3	1.3	1.2	1.2	1.2	1.3	1.1	1.3	1.5	1.5	1.4
Electrical equipment	2.1	2.1	2.1	2.2	2.3	2.2	2.2	2.3	2.4	2.2	2.1	2.2	2.3	2.5	2.1	1.8	1.8
Motor vehicles	.6	.5	.5	.4	.4	.4	.4	.4	.3	.4	.4	.4	.4	.5	.4	.5	.5
Aircraft	.8	.9	1.4	1.8	1.8	2.1	2.2	2.5	2.4	2.2	1.8	1.6	1.4	1.3	1.2	1.2	1.3
Other transportation equipment	.2	.2	.2	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
Professional and scientific instruments	2.0	2.0	2.3	2.2	2.3	2.2	2.2	2.3	2.2	2.3	2.4	2.4	2.5	2.5	2.6	3.2	3.4
Miscellaneous manufacturing	2.0	2.0	1.8	1.6	1.6	1.5	1.4	1.4	1.3	1.3	1.2	1.3	1.2	1.3	1.3	1.2	1.3
Nonmanufacturing	10.8	10.0	9.6	9.3	9.4	9.4	9.7	9.5	9.7	10.0	10.0	10.1	10.6	10.7	11.7	11.7	11.3
Mining	1.0	.7	.8	.7	.7	.7	.8	.8	.8	.7	.7	.9	.9	.8	.8	.8	.8
Petroleum extraction	.2	.2	.2	.1	.1	.1	.1	.1	.1	.2	.1	.1	.1	.1	.2	.2	.2
Other mining	.8	.5	.6	.6	.6	.5	.6	.7	.7	.5	.6	.8	.8	.7	.6	.6	.6
Construction	.2	.2	.2	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
Transportation, communications, and public utilities	.8	.7	.6	.6	.7	.7	.6	.7	.7	.6	.6	.6	.6	.6	.6	.6	.6
Railroads	.4	.4	.3	[illegible]	.3	.3	.3	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
Other transportation	(a)	(a)	(a)	(a)	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	(a)	(a)
Telecommunications	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Radio and TV	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Public utilities	.4	.4	.3	.3	.3	.3	.3	.4	.3	.3	.3	.3	.3	.3	.4	.4	.4
Other industries	8.8	8.4	8.0	7.9	7.9	7.9	8.2	7.9	8.1	8.6	8.6	8.5	9.0	9.2	10.2	10.2	9.8
Miscellaneous business services	5.5	5.2	5.2	4.9	4.8	4.9	5.1	4.9	5.2	5.6	5.7	5.7	6.0	6.0	6.4	6.3	5.9
Medical and dental laboratories	.2	.2	.2	.3	.3	.3	.3	.2	.2	.2	.2	.2	.2	.2	.3	.3	.3
Engineering and architectural services	.4	.4	.3	.3	.4	.4	.4	.5	.4	.4	.4	.4	.4	.4	.5	.3	.3
Other nonmanufacturing	2.7	2.7	2.4	2.4	2.4	2.3	2.4	2.3	2.2	2.2	2.2	2.3	2.5	2.7	3.0	3.4	3.4
Government	8.6	9.3	9.8	9.7	9.1	8.9	9.0	8.8	8.3	8.4	8.0	8.0	8.4	8.9	9.1	9.4	9.5
Federal	6.3	7.0	7.6	7.5	6.8	6.7	6.7	6.4	6.0	6.0	5.8	5.6	6.1	6.5	6.8	7.1	7.0
State	1.6	1.4	1.4	1.3	1.3	1.2	1.3	1.3	1.2	1.3	1.2	1.3	1.3	1.3	1.2	1.3	1.3
Local	.8	.9	.8	.9	1.0	1.0	1.0	1.1	1.0	1.1	1.0	1.1	1.0	1.1	1.1	1.0	1.1
Universities and colleges	19.9	17.6	15.3	14.7	14.3	15.2	16.1	15.8	17.2	18.3	18.4	18.1	17.6	17.5	17.4	17.0	16.2
Nonprofit institutions	1.2	1.2	1.3	1.2	1.3	1.4	1.3	1.3	1.3	1.4	1.3	1.4	1.3	1.4	1.3	1.3	1.3

(a) Less than 50 and 0.05 percent. Note: Detail may not add to totals because of rounding. Source: Bureau of Labor Statistics.

TABLE A-6. ESTIMATED EMPLOYMENT OF PHYSICISTS, BY SECTOR, 1950-66

(In thousands)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	13.7	14.8	16.3	17.5	18.6	19.3	20.9	23.1	25.5	27.9	29.1	30.9	33.2	35.4	38.1	39.0	41.0
Private industry	5.5	6.3	7.3	8.3	9.1	9.2	9.9	11.1	11.6	12.4	12.5	13.0	14.0	14.7	15.6	15.3	16.2
Manufacturing	3.9	4.5	5.4	6.4	6.9	6.9	7.4	8.4	8.7	9.3	9.2	9.5	10.0	10.4	10.8	10.3	10.9
Ordnance	.1	.1	.3	.6	.6	.5	.5	.6	.6	1.1	1.3	1.4	2.2	2.2	2.2	2.4	2.4
Food	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Textiles and apparel	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Lumber and furniture	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Paper	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	.1	.1
Chemicals	.5	.6	.7	.7	.8	.8	.8	.9	1.0	1.1	1.1	1.1	1.3	1.5	1.6	1.8	2.0
Petroleum refining	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.2	.2
Rubber	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	(a)	.1
Stone, clay, and glass	.1	.1	.1	.1	.1	.1	.2	.2	.2	.2	.2	.2	.2	.2	.2	.1	.1
Primary metals	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.3	.1	.1	.1	(a)	(a)
Fabricated metals	.1	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.3	.3	.4	.3	.2
Machinery	.4	.5	.5	.6	.6	.6	.6	.7	.7	.8	.8	.9	.9	.9	.9	.8	.7
Electrical equipment	1.2	1.3	1.5	1.7	1.8	1.8	1.9	2.2	2.4	2.3	2.4	2.5	2.4	2.6	2.4	2.3	2.6
Motor vehicles	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.3	.2	.2
Aircraft	.5	.7	1.0	1.3	1.6	1.7	1.9	2.3	2.2	2.2	1.7	1.4	1.2	1.1	1.2	1.1	1.2
Other transportation equipment	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Professional and scientific instruments	.5	.5	.6	.7	.7	.7	.8	.8	.9	.9	1.0	1.1	1.0	1.1	1.1	.9	1.0
Miscellaneous manufacturing	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
Nonmanufacturing	1.6	1.8	1.9	1.9	2.2	2.3	2.5	2.7	2.9	3.1	3.3	3.5	4.0	4.3	4.8	5.0	5.3
Mining	(a)	(a)	(a)	(a)	(a)	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	(a)	(a)
Petroleum extraction	(a)	(a)	(a)	(a)	(a)	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	(a)	(a)
Other mining	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Construction	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Transportation, communications, and public utilities	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Railroads	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other transportation	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Telecommunications	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Radio and TV	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Public utilities	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other industries	1.6	1.8	1.9	1.9	2.2	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.9	4.2	4.7	5.0	5.3
Miscellaneous business services	1.3	1.4	1.5	1.5	1.7	1.7	1.8	2.0	2.2	2.4	2.6	2.8	3.1	3.4	3.7	4.3	4.5
Medical and dental laboratories	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Engineering and architectural services	.2	.3	.3	.3	.4	.4	.5	.5	.5	.5	.5	.5	.6	.6	.8	.5	.6
Other nonmanufacturing	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.2	.2	.2	.2	.2
Government	2.3	2.7	3.1	3.1	2.9	2.8	2.8	2.8	3.2	3.5	3.7	4.2	4.6	5.0	5.3	5.6	5.9
Federal	2.3	2.7	3.1	3 1	2.9	2.8	2.8	2.8	3.2	3.5	3.7	4.2	4.6	5.0	5.3	5.6	5.9
State	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Local	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Universities and colleges	5.6	5.5	5.5	5.7	6.2	6.8	7.7	8.6	10.1	11.3	12.2	12.9	13.6	14.6	16.1	16.9	17.7
Nonprofit institutions	.3	.3	.4	.4	.4	.5	.5	.6	.6	.7	.7	.8	1.0	1.1	1.1	1.2	1.2

(Percent distribution)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Private industry	40.2	42.6	44.7	47.4	48.9	47.7	47.4	48.1	45.4	44.5	42.9	42.0	42.2	41.6	40.9	39.2	39.6
Manufacturing	28.5	30.4	33.1	36.6	37.1	35.8	35.4	36.4	34.1	33.3	31.6	30.7	30.1	29.4	28.3	26.4	26.6
Ordnance	.7	.7	1.8	3.4	3.2	2.6	2.4	2.6	2.4	3.9	4.5	4.5	6.6	6.2	5.8	6.2	5.9
Food	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Textiles and apparel	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Lumber and furniture	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Paper	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.3	.3	.2
Chemicals	3.6	4.1	4.3	4.0	4.3	4.1	3.8	3.9	3.9	3.9	3.8	3.6	3.9	4.2	4.2	4.6	4.9
Petroleum refining	.7	.7	.6	.6	.5	.5	.5	.4	.4	.4	.3	.3	.3	.3	.3	.5	.5
Rubber	.7	.7	.6	.6	.5	.5	.5	.4	.4	.4	.3	.3	.3	.3	.3	(a)	.2
Stone, clay, and glass	.7	.7	.6	.6	.5	.5	1.0	.9	.8	.7	.7	.6	.6	.6	.5	.3	.2
Primary metals	.7	.7	.6	.6	.5	.5	.5	.4	.4	.4	.3	1.0	.3	.3	.3	(a)	(a)
Fabricated metals	.7	1.4	1.2	1.1	1.1	1.0	1.0	.9	.8	.7	.7	.6	.9	.8	1.0	.8	.5
Machinery	2.9	3.4	3.1	3.4	3.2	3.1	2.9	3.0	2.7	2.9	2.7	2.9	2.7	2.5	2.4	2.1	1.7
Electrical equipment	8.8	8.8	9.2	9.7	9.7	9.3	9.1	9.5	9.4	8.2	8.2	8.1	7.2	7.3	6.3	5.9	6.3
Motor vehicles	.7	.7	.6	.6	.5	.5	.5	.4	.4	.4	.3	.3	.3	.3	.8	.5	.5
Aircraft	3.6	4.7	6.1	7.4	8.6	8.8	9.1	10.0	8.6	7.9	5.8	4.5	3.6	3.1	3.1	2.8	2.9
Other transportation equipment	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Professional and scientific instruments	3.6	3.4	3.7	4.0	3.8	3.6	3.8	3.5	3.5	3.2	3.4	3.6	3.0	3.1	2.9	2.3	2.4
Miscellaneous manufacturing	.7	.7	.6	.6	.5	.5	.5	.4	.4	.4	.3	.3	.3	.3	.3	.3	.2
Nonmanufacturing	11.7	12.2	11.6	10.8	11.8	11.9	12.0	11.7	11.3	11.2	11.3	11.3	12.1	12.2	12.6	12.8	13.0
Mining	(a)	(a)	(a)	(a)	(a)	.5	.5	.4	.4	.4	.3	.3	.3	.3	.3	(a)	(a)
Petroleum extraction	(a)	(a)	(a)	(a)	(a)	.5	.5	.4	.4	.4	.3	.3	.3	.3	.3	(a)	(a)
Other mining	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Construction	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Transportation, communications, and public utilities	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Railroads	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other transportation	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Telecommunications	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Radio and TV	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Public utilities	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other industries	11.7	12.2	11.6	10.8	11.8	11.4	11.5	11.3	10.9	10.8	11.0	11.0	11.8	11.9	12.3	12.8	13.0
Miscellaneous business services	9.5	9.5	9.2	8.6	9.1	8.8	8.6	8.7	8.6	8.6	8.9	9.1	9.3	9.6	9.7	11.0	11.0
Medical and dental laboratories	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Engineering and architectural services	1.5	2.0	1.8	1.7	2.2	2.1	2.4	2.2	2.0	1.8	1.7	1.5	1.8	1.7	2.1	1.3	1.5
Other nonmanufacturing	.7	.7	.6	.6	.5	.5	.5	.4	.4	.4	.3	.3	.6	.6	.5	.5	.5
Government	16.8	18.2	19.0	17.7	15.6	14.5	13.4	12.1	12.5	12.5	12.7	13.6	13.9	14.1	13.9	14.4	14.4
Federal	16.8	18.2	19.0	17.7	15.6	14.5	13.4	12.1	12.5	12.5	12.7	13.6	13.9	14.1	13.9	14.4	14.4
State	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Local	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Universities and colleges	40.9	37.2	33.7	32.6	33.3	35.2	36.8	37.2	39.6	40.5	41.9	41.7	41.0	41.2	42.3	43.3	43.2
Nonprofit institutions	2.2	2.0	2.5	2.3	2.2	2.6	2.4	2.6	2.4	2.5	2.4	2.6	3.0	3.1	2.9	3.1	2.9

[a] Less than 50 and 0.05 percent. Note: Detail may not add to totals because of rounding. Source: Bureau of Labor Statistics.

TABLE A-7. ESTIMATED EMPLOYMENT OF GEOLOGISTS AND GEOPHYSICISTS, BY SECTOR, 1950-66

(In thousands)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	11.2	11.5	12.0	13.7	14.3	15.3	16.1	17.9	18.4	19.1	18.5	18.7	19.2	20.4	21.5	23.6	24.4
Private industry	8.4	8.4	8.8	10.2	10.7	11.1	11.6	12.8	13.0	13.1	12.1	11.8	11.7	11.9	12.1	13.4	13.9
Manufacturing	.6	.7	.7	.7	.7	.7	.8	.8	.8	.8	.8	.8	1.0	.9	.8	.6	.6
Ordnance	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	.1	.2
Food	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Textiles and apparel	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Lumber and furniture	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Paper	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Chemicals	.2	.2	.2	.2	.2	.2	.3	.3	.3	.3	.3	.3	.3	.4	.2	.1	.1
Petroleum refining	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
Rubber	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Stone, clay, and glass	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	(a)	.1	.1	.1
Primary metals	.1	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.1	.2	.2	.1	.1	.1
Fabricated metals	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Machinery	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	.2	.1	.1	(a)	(a)
Electrical equipment	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Motor vehicles	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Aircraft	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	(a)
Other transportation equipment	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Professional and scientific instruments	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Miscellaneous manufacturing	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Nonmanufacturing	7.8	7.7	8.1	9.5	10.0	10.4	10.8	12.0	12.2	12.3	11.3	11.0	10.7	11.0	11.3	12.8	13.3
Mining	7.1	7.0	7.3	8.6	9.0	9.4	9.7	10.7	10.8	10.8	9.7	9.5	9.3	9.1	9.4	10.1	10.4
Petroleum extraction	6.5	6.4	6.6	7.8	8.3	8.8	9.1	10.1	10.1	10.0	9.0	8.7	8.7	8.5	8.6	9.6	9.9
Other mining	.6	.6	.7	.8	.7	.6	.6	.6	.7	.8	.7	.8	.6	.6	.8	.5	.5
Construction	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Transportation, communications, and public utilities	.1	.1	.1	.2	.2	.2	.2	.2	.3	.3	.3	.3	.1	.3	.3	.3	.3
Railroads	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other transportation	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Telecommunications	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Radio and TV	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Public utilities	.1	.1	.1	.2	.2	.2	.2	.2	.3	.3	.3	.3	.1	.3	.3	.3	.3
Other industries	.6	.6	.7	.7	.8	.8	.9	1.1	1.1	1.2	1.3	1.2	1.3	1.6	1.6	2.4	2.6
Miscellaneous business services	.3	.3	.3	.3	.4	.4	.4	.5	.6	.6	.7	.7	.7	1.0	1.1	1.8	1.8
Medical and dental laboratories	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Engineering and architectural services	.2	.2	.3	.3	.3	.3	.4	.5	.4	.5	.5	.5	.5	.5	.4	.5	.6
Other nonmanufacturing	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	(a)	.1	.1	.1	.1	.2
Government	1.5	1.8	1.9	2.1	2.1	2.3	2.3	2.4	2.3	2.6	2.7	2.8	2.9	3.4	3.6	3.9	3.9
Federal	1.0	1.3	1.4	1.6	1.5	1.7	1.7	1.8	1.7	2.0	2.0	2.0	2.0	2.4	2.6	2.8	2.8
State	.5	.5	.5	.5	.6	.6	.6	.6	.6	.6	.7	.8	.9	1.0	1.0	1.1	1.1
Local	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.2	.2	.2	.2	.2	.2
Universities and colleges	1.2	1.2	1.2	1.3	1.4	1.8	2.1	2.5	2.9	3.2	3.5	3.8	4.2	4.6	5.3	5.8	6.1
Nonprofit institutions	.1	.1	.1	.1	.1	.1	.1	.2	.2	.2	.2	.3	.4	.5	.5	.5	.5

(Percent distribution)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Private industry	75.0	73.1	73.3	74.5	74.8	72.5	72.0	71.6	70.6	68.6	65.3	63.1	60.9	58.3	56.3	56.8	57.0
Manufacturing	5.4	6.1	5.8	5.1	4.9	4.6	5.0	4.5	4.3	4.2	4.3	4.3	5.2	4.4	3.7	2.5	2.5
Ordnance	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.5	.4	.3
Food	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Textiles and apparel	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Lumber and furniture	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Paper	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Chemicals	1.8	1.7	1.7	1.5	1.4	1.3	1.9	1.7	1.6	1.6	1.6	1.6	1.6	2.0	.9	.4	.4
Petroleum refining	.9	.9	.8	.7	.7	.7	.6	.6	.5	.5	.5	.5	.5	.5	.5	.4	.4
Rubber	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Stone, clay, and glass	.9	.9	.8	.7	.7	.7	.6	.6	.5	.5	.5	.5	.5	(a)	.5	.4	.4
Primary metals	.9	1.7	1.7	1.5	1.4	1.3	1.2	1.1	1.1	1.0	1.1	.5	1.0	1.0	.5	.4	.4
Fabricated metals	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Machinery	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.5	1.0	.5	.5	(a)	(a)
Electrical equipment	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Motor vehicles	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Aircraft	.9	.9	.8	.7	.7	.7	.6	.6	.5	.5	.5	.5	.5	.5	.5	.4	(a)
Other transportation equipment	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Professional and scientific instruments	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Miscellaneous manufacturing	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Nonmanufacturing	69.6	67.0	67.5	69.4	69.9	67.9	67.0	67.1	66.3	64.4	61.0	58.8	55.7	53.9	52.6	54.3	54.5
Mining	63.4	60.9	60.8	62.8	62.9	61.4	60.2	59.8	58.7	56.5	52.4	50.8	48.4	44.6	43.7	42.8	42.6
Petroleum extraction	58.0	55.7	55.0	56.9	58.0	57.5	56.5	56.4	54.9	52.4	48.6	46.5	45.3	41.7	40.0	40.7	40.6
Other mining	5.4	5.2	5.8	5.8	4.9	3.9	3.7	3.4	3.8	4.2	3.8	4.3	3.1	2.9	3.7	2.1	2.0
Construction	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Transportation, communications, and public utilities	.9	.9	.8	1.5	1.4	1.3	1.2	1.1	1.6	1.6	1.6	1.6	.5	1.5	1.4	1.3	1.2
Railroads	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other transportation	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Telecommunications	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Radio and TV	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Public utilities	.9	.9	.8	1.5	1.4	1.3	1.2	1.1	1.6	1.6	1.6	1.6	.5	1.5	1.4	1.3	1.2
Other industries	5.3	5.2	5.9	5.1	5.6	5.2	5.6	6.2	6.0	6.3	7.0	6.4	6.8	7.8	7.5	10.2	10.7
Miscellaneous business services	2.7	2.6	2.5	2.2	2.8	2.6	2.5	2.8	3.3	3.1	3.8	3.7	3.6	4.9	5.1	7.6	7.4
Medical and dental laboratories	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Engineering and architectural services	1.8	1.7	2.5	2.2	2.1	2.0	2.5	2.8	2.2	2.6	2.7	2.7	2.6	2.5	1.9	2.1	2.5
Other nonmanufacturing	.9	.9	.8	.7	.7	.7	.6	.6	.5	.5	.5	(a)	.5	.5	.5	.4	.8
Government	13.4	15.7	15.8	15.3	14.7	15.0	14.3	13.4	12.5	13.6	14.6	15.0	15.1	16.7	16.7	16.5	16.0
Federal	8.9	11.3	11.7	11.7	10.5	11.1	10.6	10.1	9.2	10.5	10.8	10.7	10.4	11.8	12.1	11.9	11.5
State	4.5	4.3	4.2	3.6	4.2	3.9	3.7	3.4	3.3	3.1	3.8	4.3	4.7	4.9	4.7	4.7	4.5
Local	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Universities and colleges	10.7	10.4	10.0	9.5	9.8	11.8	13.0	14.0	15.8	16.8	18.9	20.3	21.9	22.5	24.7	24.6	25.0
Nonprofit institutions	.9	.9	.8	.7	.7	.7	.6	1.1	1.1	1.0	1.1	1.6	2.1	2.5	2.3	2.1	2.0

[a] Less than 50 and 0.05 percent. Note: Detail may not add to totals because of rounding. Source: Bureau of Labor Statistics.

TABLE A-8. ESTIMATED EMPLOYMENT OF OTHER PHYSICAL SCIENTISTS,[a] BY SECTOR, 1950-66

(In thousands)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	9.7	11.7	14.5	16.2	16.5	16.5	17.6	19.6	19.7	20.5	21.2	22.8	23.3	24.4	25.5	26.2	28.3
Private industry	5.9	6.5	7.7	8.9	9.4	9.5	10.4	11.7	12.0	12.8	13.5	14.9	15.0	15.0	14.9	14.9	16.0
Manufacturing	5.2	5.8	6.8	7.8	8.2	8.2	9.0	10.3	10.6	11.2	11.9	13.3	13.4	13.2	13.0	13.0	13.9
Ordnance	(b)	(b)	(b)	.1	.1	.1	.1	.2	.1	.3	.4	.8	.6	.6	.8	.5	.6
Food	.3	.3	.4	.4	.4	.4	.4	.4	.3	.3	.3	.3	.3	.3	.3	.3	.3
Textiles and apparel	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	.1	(b)	(b)	.1	.1
Lumber and furniture	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
Paper	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	.1	.1	.1	.3	.4
Chemicals	.4	.5	.6	.6	.6	.6	.6	.7	.7	.7	.8	.9	1.2	1.3	1.3	1.4	1.5
Petroleum refining	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	.1	.1
Rubber	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	.1	.1	.1	.2	.3
Stone, clay, and glass	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.2	.2
Primary metals	1.9	2.2	2.5	2.8	3.1	3.1	3.5	4.1	4.5	4.9	5.3	6.2	5.9	5.3	4.9	4.5	4.6
Fabricated metals	.3	.3	.3	.4	.4	.4	.4	.4	.4	.4	.5	.5	.3	.5	.4	.8	.8
Machinery	.6	.7	.8	.8	.8	.8	.9	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.2	1.2	1.2
Electrical equipment	.6	.6	.7	.8	.8	.8	.9	1.0	1.1	1.1	1.1	1.1	1.3	1.4	1.6	1.3	1.4
Motor vehicles	.5	.5	.5	.5	.5	.5	.6	.6	.6	.6	.6	.6	.6	.7	.6	.5	.5
Aircraft	.3	.4	.7	1.1	1.2	1.2	1.3	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.4	1.2	1.4
Other transportation equipment	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	.1
Professional and scientific instruments	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.3	.4	.2	.1	.4	.4
Miscellaneous manufacturing	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	.1	(b)	(b)
Nonmanufacturing	.7	.7	.9	1.1	1.2	1.3	1.4	1.4	1.4	1.6	1.6	1.6	1.6	1.8	1.9	1.9	2.1
Mining	.3	.3	.3	.3	.3	.4	.4	.4	.4	.5	.5	.3	.4	.5	.3	.4	.4
Petroleum extraction	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	.1	.1
Other mining	.3	.3	.3	.3	.3	.4	.4	.4	.4	.5	.5	.3	.4	.5	.3	.3	.3
Construction	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
Transportation, communications, and public utilities	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	(b)	(b)	(b)	(b)	(b)
Railroads	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
Other transportation	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	(b)	(b)	(b)	(b)	(b)	(b)
Telecommunications	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
Radio and TV	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
Public utilities	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	.1	(b)	(b)	(b)	(b)	(b)
Other industries	.3	.3	.5	.7	.8	.8	.9	.9	.9	1.0	1.0	1.2	1.2	1.3	1.6	1.5	1.7
Miscellaneous business services	.2	.2	.3	.4	.5	.5	.5	.5	.5	.6	.6	.7	.7	.8	.8	1.0	1.0
Medical and dental laboratories	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
Engineering and architectural services	(b)	(b)	(b)	.1	.1	.1	.2	.2	.2	.2	.2	.2	.2	.2	.5	.2	.3
Other nonmanufacturing	.1	.1	.2	.2	.2	.2	.2	.2	.2	.2	.2	.3	.3	.3	.3	.3	.4
Government	3.5	4.9	6.5	6.9	6.6	6.5	6.7	7.3	7.0	6.9	6.7	6.8	7.0	7.5	8.0	8.2	8.6
Federal	3.3	4.6	6.2	6.6	6.3	6.2	6.4	7.0	6.6	6.5	6.3	6.4	6.6	7.2	7.8	8.0	8.4
State	.1	.2	.2	.2	.2	.2	.2	.2	.3	.3	.3	.3	.3	.2	.1	.1	.1
Local	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
Universities and colleges	.2	.2	.2	.2	.3	.3	.3	.4	.5	.5	.7	.8	.9	1.4	2.1	2.6	3.1
Nonprofit institutions	.1	.1	.1	.2	.2	.2	.2	.2	.2	.3	.3	.3	.4	.5	.5	.5	.6

(Percent distribution)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Private industry	60.8	55.6	53.1	55.0	57.0	57.6	59.1	59.7	60.9	62.3	63.7	65.3	64.4	61.5	58.4	56.8	56.5
Manufacturing	53.6	49.6	46.9	.48.1	49.7	49.7	51.1	52.6	53.8	54.6	56.1	58.3	57.5	54.1	51.0	49.6	49.1
Ordnance	(b)	(b)	(b)	.6	.6	.6	.6	1.0	.5	1.5	1.9	3.5	2.6	2.5	3.1	1.9	2.1
Food	3.1	2.6	2.8	2.5	2.4	2.4	2.3	2.0	1.5	1.5	1.4	1.3	1.3	1.2	1.2	1.1	1.1
Textiles and apparel	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	.4	(b)	(b)	.4	.4
Lumber and furniture	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
Paper	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	.4	.4	.4	1.1	1.4
Chemicals	4.1	4.3	4.1	3.7	3.6	3.6	3.4	3.6	3.6	3.4	3.8	3.9	5.2	5.3	5.1	5.3	5.3
Petroleum refining	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	.4	.4
Rubber	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	.4	.4	.4	.8	1.1
Stone, clay, and glass	1.0	.9	.7	.6	.6	.6	.6	.5	.5	.5	.5	.4	.4	.4	.4	.8	.7
Primary metals	19.6	18.8	17.2	17.3	18.8	18.8	19.9	20.9	22.8	23.9	25.0	27.2	25.3	21.7	19.2	17.2	16.3
Fabricated metals	3.1	2.6	2.1	2.5	2.4	2.4	2.3	2.0	2.0	2.0	2.4	2.2	1.3	2.0	1.6	3.1	2.8
Machinery	6.2	6.0	5.5	4.9	4.8	4.8	5.1	5.1	5.1	4.9	4.7	4.4	4.3	4.5	4.7	4.6	4.2
Electrical equipment	6.2	5.1	4.8	4.9	4.8	4.8	5.1	5.1	5.6	5.4	5.2	4.8	5.6	5.7	6.3	5.0	4.9
Motor vehicles	5.2	4.3	3.4	3.1	3.0	3.0	3.4	3.1	3.0	2.9	2.8	2.6	2.6	2.9	2.4	1.9	1.8
Aircraft	3.1	3.4	4.8	6.8	7.3	7.3	7.4	8.2	8.1	7.8	7.5	6.6	6.4	6.1	5.5	4.6	4.9
Other transportation equipment	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	.4
Professional and scientific instruments	2.1	1.7	1.4	1.2	1.2	1.2	1.1	1.0	1.0	1.0	.9	1.3	1.7	.8	.4	1.5	1.4
Miscellaneous manufacturing	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	.4	(b)	(b)
Nonmanufacturing	7.2	6.0	6.2	6.9	7.3	7.9	8.0	7.1	7.1	7.7	7.6	7.0	6.9	7.4	7.4	7.2	7.4
Mining	3.1	2.6	2.1	1.9	1.8	2.4	2.3	2.0	2.0	2.4	2.4	1.3	1.7	2.0	1.2	1.5	1.4
Petroleum extraction	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	.4	.4
Other mining	3.1	2.6	2.1	1.9	1.8	2.4	2.3	2.0	2.0	2.4	2.4	1.3	1.7	2.0	1.2	1.1	1.1
Construction	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
Transportation, communications, and public utilities	1.0	.9	.7	.6	.6	.6	.6	.5	.5	.5	.5	.4	(b)	(b)	(b)	(b)	(b)
Railroads	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
Other transportation	1.0	.9	.7	.6	.6	.6	.6	.5	.5	.5	.5	(b)	(b)	(b)	(b)	(b)	(b)
Telecommunications	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
Radio and TV	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
Public utilities	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	.4	(b)	(b)	(b)	(b)	(b)
Other industries	3.1	2.5	3.4	4.4	4.9	4.9	5.1	4.6	4.6	4.8	4.7	5.3	5.2	5.4	6.2	5.7	6.0
Miscellaneous business services	2.1	1.7	2.1	2.5	3.0	3.0	2.8	2.6	2.5	2.9	2.8	3.1	3.0	3.3	3.1	3.8	3.5
Medical and dental laboratories	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
Engineering and architectural services	1.0	.9	.7	1.2	1.2	1.2	1.1	1.0	1.0	1.0	.9	.9	.9	.8	2.0	.8	1.1
Other nonmanufacturing	(b)	(b)	(b)	.6	.6	.6	1.1	1.0	1.0	1.0	.9	1.3	1.3	1.2	1.2	1.1	1.4
Government	36.1	41.9	44.8	42.6	40.0	39.4	38.1	37.2	35.5	33.7	31.6	29.8	30.0	30.7	31.4	31.3	30.4
Federal	34.0	39.3	42.8	40.7	38.2	37.6	36.4	35.7	33.5	31.7	29.7	28.1	28.3	29.5	30.6	30.5	29.7
State	1.0	1.7	1.4	1.2	1.2	1.2	1.1	1.0	1.5	1.5	1.4	1.3	1.3	.8	.4	.4	.4
Local	1.0	.9	.7	.6	.6	.6	.6	.5	.5	.5	.5	.4	.4	.4	.4	.4	.4
Universities and colleges	2.1	1.7	1.4	1.2	1.8	1.8	1.7	2.0	2.5	2.4	3.3	3.5	3.9	5.7	8.2	9.9	11.0
Nonprofit institutions	1.0	.9	.7	1.2	1.2	1.2	1.1	1.0	1.0	1.5	1.4	1.3	1.7	2.0	2.0	1.9	2.1

[a] Includes metallurgists. [b] Less than 50 and 0.05 percent. Note: Detail may not add to totals because of rounding. Source: Bureau of Labor Statistics

TABLE A-9. ESTIMATED EMPLOYMENT OF MATHEMATICIANS, BY SECTOR, 1950-66

(In thousands)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	13.5	14.4	15.8	17.4	19.3	20.9	22.9	25.8	28.2	31.1	33.6	35.2	38.5	41.9	45.4	48.9	51.8
Private industry	8.2	8.8	10.0	11.5	12.5	13.2	14.2	15.4	16.0	17.4	18.5	19.0	21.4	23.0	24.5	26.5	28.2
Manufacturing	3.3	3.7	4.6	5.8	6.2	6.6	7.1	8.1	8.3	8.9	9.7	10.1	11.7	12.6	12.7	14.9	15.2
Ordnance	.1	.1	.3	.5	.5	.5	.5	.6	.6	1.0	1.2	1.3	2.0	2.1	2.3	2.9	3.1
Food	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
Textiles and apparel	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	(a)	(a)	(a)	.3	.4
Lumber and furniture	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Paper	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.2	.2	.2	.2	.3
Chemicals	.3	.4	.4	.5	.6	.6	.6	.7	.7	.7	.7	.7	.8	.9	.9	1.2	1.3
Petroleum refining	.1	.1	.1	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.1	.2
Rubber	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	(a)	(a)
Stone, clay, and glass	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	.1	.1	.1
Primary metals	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.3	.3
Fabricated metals	.3	.3	.4	.4	.4	.4	.5	.5	.5	.5	.5	.5	.7	.6	.5	.5	.5
Machinery	.6	.7	.8	.9	.9	1.0	1.0	1.2	1.2	1.3	1.5	1.6	1.8	2.2	2.5	2.7	2.7
Electrical equipment	.8	.9	1.0	1.2	1.3	1.3	1.5	1.7	1.9	1.9	2.1	2.3	2.4	2.5	2.2	2.4	2.5
Motor vehicles	.2	.2	.2	.2	.2	.3	.3	.3	.3	.3	.3	.3	.3	.3	.4	.4	.4
Aircraft	.3	.4	.8	1.1	1.3	1.5	1.7	2.1	2.1	2.1	2.3	2.3	2.4	2.6	2.7	2.8	2.8
Other transportation equipment	(a)	(a)	(a)	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
Professional and scientific instruments	.1	.1	.1	.2	.2	.2	.2	.2	.2	.3	.3	.3	.4	.4	.2	.2	.2
Miscellaneous manufacturing	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	.2
Nonmanufacturing	4.9	5.1	5.4	5.7	6.3	6.6	7.1	7.3	7.7	8.5	8.8	8.9	9.7	10.4	11.8	11.6	13.0
Mining	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.2	.2
Petroleum extraction	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
Other mining	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	.1
Construction	.1	.1	.1	.1	.1	.1	.1	.1	.1	.2	.2	.1	.2	.2	.2	.3	.3
Transportation, communications, and public utilities	.2	.2	.2	.3	.3	.3	.3	.3	.3	.3	.3	.3	.4	.4	.6	.4	.4
Railroads	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	.1	.1
Other transportation	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Telecommunications	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
Radio and TV	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Public utilities	.1	.1	.1	.2	.2	.2	.2	.2	.2	.2	.2	.2	.3	.3	.4	.2	.2
Other industries	4.5	4.7	5.0	5.2	5.8	6.1	6.6	6.8	7.2	7.9	8.2	8.4	9.0	9.7	10.9	10.7	12.1
Miscellaneous business services	1.7	1.8	2.0	2.1	2.2	2.4	2.6	2.8	3.0	3.5	3.7	3.8	4.1	4.5	5.0	4.1	4.8
Medical and dental laboratories	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Engineering and architectural services	.2	.3	.3	.3	.4	.4	.5	.5	.5	.5	.5	.5	.6	.6	.8	.5	.8
Other nonmanufacturing	2.6	2.6	2.7	2.8	3.2	3.3	3.5	3.5	3.7	3.9	4.0	4.1	4.3	4.6	5.1	6.1	6.5
Government	1.1	1.5	1.6	1.6	1.5	1.9	2.2	2.4	2.3	2.5	2.6	2.8	2.7	3.3	3.7	4.2	4.6
Federal	.9	1.3	1.4	1.4	1.3	1.7	2.0	2.2	2.1	2.2	2.2	2.4	2.3	2.9	3.3	3.8	4.1
State	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.3	.3	.3	.3	.3	.3	.4
Local	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	.1	.1	.1	.1	.1	.1	.1
Universities and colleges	4.1	4.0	4.0	4.1	5.1	5.6	6.3	7.8	9.6	10.8	12.0	12.8	13.5	14.5	15.9	16.8	17.5
Nonprofit institutions	.1	.1	.2	.2	.2	.2	.2	.2	.3	.4	.5	.6	.9	1.1	1.3	1.4	1.5

(Percent distribution)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Private industry	60.7	61.1	63.2	66.1	64.8	63.1	61.9	59.7	56.8	55.9	55.1	54.1	55.6	55.0	53.9	54.1	54.5
Manufacturing	24.4	25.7	29.1	33.3	32.1	31.6	31.0	31.4	29.4	28.6	28.9	28.7	30.4	30.1	28.0	30.5	29.3
Ordnance	.7	.7	1.9	2.9	2.6	2.4	2.2	2.3	2.1	3.2	3.6	3.7	5.2	5.0	5.1	5.9	6.0
Food	.7	.7	.6	.6	.5	.5	.4	.4	.4	.3	.3	.3	.3	.2	.2	.2	.2
Textiles and apparel	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.3	(a)	(a)	(a)	.6	.8
Lumber and furniture	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Paper	.7	.7	.6	.6	.5	.5	.4	.4	.4	.3	.3	.3	.6	.5	.4	.4	.6
Chemicals	2.2	2.8	3.0	2.9	3.1	2.9	2.6	2.7	2.5	2.3	2.1	2.0	2.1	2.1	2.0	2.5	2.5
Petroleum refining	.7	.7	.6	1.1	1.0	1.0	.9	.8	.7	.6	.6	.6	.5	.5	.4	.2	.4
Rubber	.7	.7	.6	.6	.5	.5	.4	.4	.4	.3	.3	.3	.3	.2	.2	(a)	(a)
Stone, clay, and glass	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.2	.2	.2	.2
Primary metals	1.5	1.4	1.3	1.1	1.0	1.0	.9	.8	.7	.6	.6	.6	.5	.5	.4	.6	.6
Fabricated metals	2.2	2.1	2.5	2.3	2.1	1.9	2.2	1.9	1.8	1.6	1.5	1.4	1.8	1.4	1.1	.1	1.0
Machinery	4.4	4.9	5.1	5.2	4.7	4.8	4.4	4.7	4.3	4.2	4.5	4.5	4.7	5.3	5.5	5.5	5.2
Electrical equipment	5.9	6.2	6.3	6.9	6.7	6.2	6.6	6.6	6.7	6.1	6.2	6.5	6.2	6.0	4.8	4.9	4.8
Motor vehicles	1.5	1.4	1.3	1.1	1.0	1.4	1.3	1.2	1.1	1.0	.9	.9	.8	.7	.9	.8	.8
Aircraft	2.2	2.8	5.1	6.3	6.7	7.2	7.4	8.1	7.4	6.8	6.8	6.5	6.2	6.2	5.9	5.7	5.4
Other transportation equipment	(a)	(a)	(a)	.6	.5	.5	.4	.4	.4	.3	.3	.3	.3	.2	.2	.2	.2
Professional and scientific instruments	.7	.7	.6	1.1	1.0	1.0	.9	.8	.7	1.0	.9	.9	1.0	1.0	.4	.4	.4
Miscellaneous manufacturing	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	1.2	.4
Nonmanufacturing	36.3	35.4	34.1	32.8	32.7	31.5	30.9	28.3	27.4	27.3	26.2	25.4	25.2	24.9	25.9	23.6	25.2
Mining	.7	.7	.6	.6	.5	.5	.4	.4	.4	.3	.3	.3	.3	.2	.2	.4	.4
Petroleum extraction	.7	.7	.6	.6	.5	.5	.4	.4	.4	.3	.3	.3	.3	.2	.2	.2	.2
Other mining	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.2	.2
Construction	.7	.7	.6	.6	.5	.5	.4	.4	.4	.6	.6	.3	.5	.5	.4	.6	.6
Transportation, communications, and public utilities	1.5	1.4	1.3	1.7	1.6	1.4	1.3	1.2	1.1	1.0	.9	.9	1.0	1.0	1.3	.8	.8
Railroads	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.2	.2	.2
Other transportation	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Telecommunications	.7	.7	.6	.6	.5	.5	.4	.4	.4	.3	.3	.3	.3	.2	.2	.2	.2
Radio and TV	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Public utilities	.7	.7	.6	1.1	1.0	1.0	.9	.8	.7	.6	.6	.6	.8	.7	.9	.4	.4
Other industries	33.4	32.6	31.6	29.9	30.1	29.1	28.8	26.3	25.5	25.4	24.4	23.9	23.4	23.2	24.0	21.8	23.4
Miscellaneous business services	12.6	12.5	12.7	12.1	11.4	11.5	11.4	10.9	10.6	11.3	11.0	10.8	10.6	10.7	11.0	8.4	9.3
Medical and dental laboratories	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Engineering and architectural services	1.5	2.1	1.9	1.7	2.1	1.9	2.2	1.9	1.8	1.6	1.5	1.4	1.6	1.4	1.8	1.0	1.5
Other nonmanufacturing	19.3	18.1	17.1	16.1	16.6	15.8	15.3	13.6	13.1	12.5	11.9	11.6	11.2	11.0	11.2	12.5	12.5
Government	8.1	10.4	10.1	9.2	7.8	9.1	9.6	9.3	8.2	8.0	7.7	8.0	7.0	7.9	8.1	8.6	8.9
Federal	6.7	9.0	8.9	8.0	6.7	8.1	8.7	8.5	7.4	7.1	6.5	6.8	6.0	6.9	7.3	7.8	7.9
State	1.5	1.4	1.3	1.1	1.0	1.0	.9	.8	.7	.6	.9	.9	.8	.7	.7	.6	.8
Local	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.3	.3	.3	.3	.2	.2	.2	.2
Universities and colleges	30.4	27.8	25.3	23.6	26.4	26.8	27.5	30.2	34.0	34.7	35.7	36.3	35.1	34.6	35.0	34.4	33.8
Nonprofit institutions	.7	.7	1.3	1.1	1.0	1.0	.9	.8	1.1	1.3	1.5	1.7	2.3	2.6	2.9	2.9	2.9

[a] Less than 50 and 0.05 percent.

Note: Detail may not add to totals because of rounding.

Source: Bureau of Labor Statistics.

TABLE A-10. ESTIMATED EMPLOYMENT OF AGRICULTURAL SCIENTISTS, BY SECTOR, 1950-66

(In thousands)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	17.2	18.5	20.7	21.8	22.0	22.6	24.1	26.0	27.7	29.9	30.9	32.8	35.8	39.0	42.1	44.7	47.6
Private industry	2.7	3.0	3.2	3.3	3.4	3.7	3.9	4.2	4.4	4.6	4.9	5.0	5.2	5.8	5.9	6.1	6.1
Manufacturing	1.7	2.0	2.1	2.2	2.3	2.5	2.6	2.9	3.1	3.2	3.3	3.3	3.4	3.7	3.8	3.6	3.5
Ordnance	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Food	1.0	1.1	1.2	1.2	1.2	1.3	1.3	1.4	1.4	1.5	1.6	1.6	1.6	1.8	1.7	1.7	1.5
Textiles and apparel	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Lumber and furniture	.1	.1	.1	.1	.1	.1	.1	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
Paper	.1	.2	.2	.2	.2	.3	.3	.3	.4	.4	.4	.4	.5	.5	.7	.5	.6
Chemicals	.4	.5	.5	.6	.7	.7	.8	.9	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1
Petroleum refining	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Rubber	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Stone, clay, and glass	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Primary metals	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	(a)	(a)	(a)
Fabricated metals	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Machinery	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	.1	.1
Electrical equipment	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Motor vehicles	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Aircraft	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other transportation equipment	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Professional and scientific instruments	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Miscellaneous manufacturing	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Nonmanufacturing	1.0	1.0	1.1	1.1	1.1	1.2	1.3	1.3	1.3	1.4	1.6	1.7	1.8	2.1	2.1	2.5	2.6
Mining	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	.1	.1	.1	.1
Petroleum extraction	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other mining	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	.1	.1	.1	.1
Construction	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Transportation, communications, and public utilities	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.2	.1
Railroads	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other transportation	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Telecommunications	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Radio and TV	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Public utilities	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.2	.1
Other industries	.9	.9	1.0	1.0	1.0	1.1	1.2	1.2	1.2	1.3	1.5	1.6	1.6	1.9	1.9	2.2	2.4
Miscellaneous business services	.2	.2	.2	.2	.2	.2	.3	.3	.3	.3	.4	.5	.5	.7	.6	.8	.8
Medical and dental laboratories	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Engineering and architectural services	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other nonmanufacturing	.7	.7	.8	.8	.8	.9	.9	.9	.9	1.0	1.1	1.1	1.1	1.2	1.3	1.4	1.6
Government	10.8	11.9	13.9	14.8	14.5	14.8	15.5	16.4	17.0	18.2	18.4	18.8	20.0	20.6	20.9	21.1	21.5
Federal	7.7	8.7	10.5	11.4	10.9	11.1	11.6	12.3	12.6	13.6	13.5	13.7	14.6	15.2	15.4	15.5	15.6
State	2.3	2.4	2.6	2.6	2.8	2.8	2.9	3.1	3.3	3.5	3.7	3.9	4.1	4.1	4.2	4.3	4.5
Local	.8	.8	.8	.8	.8	.9	1.0	1.0	1.1	1.1	1.2	1.2	1.3	1.3	1.3	1.3	1.4
Universities and colleges	3.6	3.5	3.5	3.6	4.0	4.0	4.6	5.3	6.2	7.0	7.5	8.9	10.5	12.5	15.2	17.4	19.9
Nonprofit institutions	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1

(Percent distribution)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Private industry	15.7	16.2	15.4	15.1	15.5	16.4	16.2	16.2	15.9	15.3	15.9	15.3	14.5	14.9	14.0	13.6	12.9
Manufacturing	9.9	10.8	10.1	10.1	10.5	11.1	10.8	11.2	11.2	10.7	10.7	10.1	9.5	9.5	9.0	8.1	7.4
Ordnance	(a)	(a)	(a)	(a)	(a)	a	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Food	5.8	5.9	5.8	5.5	5.5	5.8	5.4	5.4	5.1	5.0	5.2	4.9	4.5	4.6	4.0	3.8	3.2
Textiles and apparel	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Lumber and furniture	.6	.5	.5	.5	.5	.4	.4	.8	.7	.7	.6	.6	.6	.5	.5	.4	.4
Paper	.6	1.1	1.0	.9	.9	1.3	1.2	1.2	1.4	1.3	1.3	1.2	1.4	1.3	1.7	1.1	1.3
Chemicals	2.3	2.7	2.4	2.8	3.2	3.1	3.3	3.5	3.6	3.3	3.2	3.0	2.8	2.8	2.6	2.5	2.3
Petroleum refining	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Rubber	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Stone, clay, and glass	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Primary metals	.6	.5	.5	.5	.5	.4	.4	.4	.4	.3	.3	.3	.3	.3	.2	(a)	(a)
Fabricated metals	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Machinery	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.2	.2	.2
Electrical equipment	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Motor vehicles	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Aircraft	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other transportation equipment	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Professional and scientific instruments	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Miscellaneous manufacturing	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Nonmanufacturing	5.8	5.4	5.3	5.0	5.0	5.3	5.4	5.0	4.7	4.6	5.2	5.2	5.0	5.4	5.0	5.5	5.5
Mining	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.3	.3	.2	.2	.2
Petroleum extraction	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other mining	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.3	.3	.2	.2	.2
Construction	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Transportation, communications, and public utilities	.6	.5	.5	.5	.5	.4	.4	.4	.4	.3	.3	.3	.3	.3	.2	.4	.2
Railroads	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other transportation	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Telecommunications	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Radio and TV	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Public utilities	.6	.5	.5	.5	.5	.4	.4	.4	.4	.3	.3	.3	.3	.3	.2	.4	.2
Other industries	5.2	4.9	4.8	4.5	4.5	4.9	5.0	4.6	4.3	4.4	4.9	4.9	4.4	4.8	4.6	4.9	5.1
Miscellaneous business services	1.2	1.1	1.0	.9	.9	.9	1.2	1.2	1.1	1.0	1.3	1.5	1.4	1.8	1.4	1.8	1.7
Medical and dental laboratories	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Engineering and architectural services	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other nonmanufacturing	4.1	3.8	3.9	3.7	3.6	4.0	3.7	3.5	3.2	3.3	3.6	3.4	3.1	3.1	3.1	3.1	3.4
Government	62.8	64.3	67.1	67.9	65.9	65.5	64.3	63.1	61.4	60.9	59.5	57.3	55.9	52.8	49.6	47.2	45.2
Federal	44.8	47.0	50.7	52.3	49.5	49.1	48.1	47.3	45.5	45.5	43.7	41.8	40.8	39.0	36.6	34.7	32.8
State	13.4	13.0	12.6	11.9	12.7	12.4	12.0	11.9	11.9	11.7	12.0	11.9	11.5	10.5	10.0	9.6	9.5
Local	4.7	4.3	3.9	3.7	3.6	4.0	4.1	3.8	4.0	3.7	3.9	3.7	3.6	3.3	3.1	2.9	2.9
Universities and colleges	20.9	18.9	16.9	16.5	18.2	17.7	19.1	20.4	22.4	23.4	24.3	27.1	29.3	32.1	36.1	38.9	41.8
Nonprofit institutions	.6	.5	.5	.5	.5	.4	.4	.4	.4	.3	.3	.3	.3	.3	.2	.2	.2

[a] Less than 50 and 0.05 percent. Note: Detail may not add to totals because of rounding. Source: Bureau of Labor Statistics

TABLE A-11. ESTIMATED EMPLOYMENT OF BIOLOGICAL SCIENTISTS, BY SECTOR, 1950-66

(In thousands)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	19.9	21.2	23.0	24.1	25.5	27.3	29.9	34.8	39.0	42.5	44.7	46.9	48.9	51.3	54.3	55.6	56.8
Private industry	3.6	4.3	4.8	5.1	5.3	5.4	5.7	6.3	6.9	7.1	7.4	8.2	8.6	9.1	9.4	9.4	9.9
Manufacturing	2.9	3.5	4.0	4.3	4.4	4.5	4.8	5.4	5.9	5.9	6.1	6.9	7.2	7.4	7.6	7.6	7.8
Ordnance	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	.1	.2	.4	.4	.3	.3
Food	.4	.4	.4	.4	.4	.5	.5	.5	.5	.5	.5	.6	.6	.6	.7	.7	.7
Textiles and apparel	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Lumber and furniture	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Paper	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	.1	.1	(a)	(a)	(a)	(a)
Chemicals	2.5	3.1	3.6	3.9	4.0	4.0	4.3	4.9	5.4	5.4	5.5	6.0	6.0	6.0	6.1	6.1	6.3
Petroleum refining	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	.1	(a)	(a)	(a)
Rubber	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Stone, clay, and glass	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Primary metals	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Fabricated metals	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	(a)	(a)
Machinery	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	.1	.1	.1	.1
Electrical equipment	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.2	.2
Motor vehicles	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Aircraft	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	.1	.1	.1
Other transportation equipment	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Professional and scientific instruments	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	.1	.1	.1	.1	.1
Miscellaneous manufacturing	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Nonmanufacturing	.7	.8	.8	.8	.9	.9	.9	.9	1.0	1.2	1.3	1.3	1.4	1.7	1.8	1.8	2.1
Mining	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	(a)	(a)	(a)
Petroleum extraction	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other mining	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	(a)	(a)	(a)
Construction	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Transportation, communications, and public utilities	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Railroads	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other transportation	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Telecommunications	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Radio and TV	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Public utilities	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other industries	.7	.8	.8	.8	.9	.9	.9	.9	1.0	1.2	1.3	1.3	1.4	1.6	1.8	1.8	2.1
Miscellaneous business services	.2	.2	.2	.2	.2	.2	.2	.2	.3	.3	.4	.4	.4	.6	.6	.4	.4
Medical and dental laboratories	.3	.4	.4	.4	.5	.5	.5	.5	.5	.6	.6	.6	.7	.7	.7	.8	.9
Engineering and architectural services	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	.1	.2
Other nonmanufacturing	.2	.2	.2	.2	.2	.2	.2	.2	.2	.3	.3	.3	.3	.3	.4	.5	.6
Government	5.6	6.3	7.0	7.2	7.5	7.9	8.5	9.2	9.6	10.3	10.6	11.1	11.7	12.3	13.0	13.8	14.4
Federal	2.1	2.5	3.1	3.3	3.3	3.6	3.9	4.2	4.5	4.8	4.8	4.9	5.2	5.6	6.0	6.4	6.7
State	2.5	2.7	2.8	2.8	3.0	3.0	3.2	3.4	3.4	3.7	4.0	4.3	4.5	4.7	5.0	5.3	5.6
Local	1.0	1.1	1.1	1.1	1.2	1.3	1.4	1.6	1.7	1.8	1.8	1.9	2.0	2.0	2.0	2.1	2.1
Universities and colleges	10.1	9.9	10.4	10.9	11.8	13.0	14.7	18.1	21.2	23.7	25.1	25.8	26.4	27.3	29.2	29.6	29.6
Nonprofit institutions	.6	.7	.8	.9	.9	1.0	1.0	1.2	1.3	1.4	1.6	1.8	2.2	2.6	2.7	2.8	2.9

(Percent distribution)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Private industry	18.1	20.3	20.9	21.2	20.9	19.6	19.2	18.1	17.7	16.7	16.5	17.5	17.6	17.5	17.3	17.0	17.4
Manufacturing	14.6	16.5	17.4	17.8	17.3	16.5	16.1	15.5	15.1	13.9	13.6	14.7	14.7	14.4	14.0	13.7	13.7
Ordnance	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.2	.2	.4	.8	.7	.5	.5
Food	2.0	1.9	1.7	1.7	1.6	1.8	1.7	1.4	1.3	1.2	1.1	1.3	1.2	1.2	1.3	1.3	1.2
Textiles and apparel	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Lumber and furniture	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Paper	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.2	.2	.2	(a)	(a)	(a)	(a)
Chemicals	12.6	14.6	15.7	16.2	15.7	14.7	14.4	14.1	13.8	12.7	12.3	12.8	12.3	11.7	11.2	11.0	11.1
Petroleum refining	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.2	(a)	(a)	(a)
Rubber	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Stone, clay, and glass	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Primary metals	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Fabricated metals	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.2	(a)	(a)
Machinery	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.2	.2	.2	.2	.2
Electrical equipment	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.4	.4
Motor vehicles	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Aircraft	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.2	.2	.2	.2
Other transportation equipment	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Professional and scientific instruments	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.2	.2	.2	.2	.2	.2
Miscellaneous manufacturing	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Nonmanufacturing	3.5	3.8	3.5	3.4	3.6	3.3	3.1	2.6	2.6	2.8	2.9	2.8	2.9	3.1	3.3	3.3	3.7
Mining	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Petroleum extraction	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other mining	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Construction	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Transportation, communications, and public utilities	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Railroads	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other transportation	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Telecommunications	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Radio and TV	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Public utilities	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other industries	3.5	3.8	3.5	3.4	3.6	3.3	3.1	2.6	2.6	2.8	2.9	2.8	2.9	3.1	3.3	3.3	3.7
Miscellaneous business services	1.0	.9	.9	.8	.8	.7	.7	.6	.8	.7	.9	.9	.8	.8	1.1	.7	.7
Medical and dental laboratories	1.5	1.9	1.7	1.7	2.0	1.8	1.7	1.4	1.3	1.4	1.3	1.3	1.4	1.4	1.3	1.4	1.6
Engineering and architectural services	1.0	.9	.9	.8	.8	.7	.7	.6	(a)	(a)	(a)	(a)	(a)	(a)	.2	.2	.4
Other nonmanufacturing	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.5	.7	.7	.6	.6	.6	.7	.9	1.1
Government	28.1	29.7	30.4	29.9	29.4	28.9	28.4	26.4	24.6	24.2	23.7	23.7	23.9	24.0	23.9	24.8	25.4
Federal	10.6	11.8	13.5	13.7	12.9	13.2	13.0	12.1	11.5	11.3	10.7	10.4	10.6	10.9	11.0	11.5	11.8
State	12.6	12.7	12.2	11.6	11.8	11.0	10.7	9.8	8.7	8.7	8.9	9.2	9.2	9.2	9.2	9.5	9.9
Local	5.0	5.2	4.8	4.6	4.7	4.8	4.7	4.6	4.4	4.2	4.0	4.1	4.1	3.9	3.7	3.8	3.7
Universities and colleges	50.8	46.7	45.2	45.2	46.3	47.6	49.2	52.0	54.4	55.8	56.2	55.0	54.0	53.2	53.8	53.2	52.1
Nonprofit institutions	3.0	3.3	3.5	3.7	3.5	3.7	3.3	3.4	3.3	3.3	3.6	3.8	4.5	5.1	5.0	5.0	5.1

[a] Less than 50 and 0.05 percent. Note: Detail may not add to totals because of rounding. Source: Bureau of Labor Statistics.

TABLE A-12. ESTIMATED EMPLOYMENT OF MEDICAL SCIENTISTS, BY SECTOR, 1950-66

(In thousands)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	9.2	9.9	10.7	11.5	12.2	12.9	14.3	17.2	19.6	21.1	22.7	25.5	28.8	32.7	37.2	40.9	46.2
Private industry	2.5	3.0	3.2	3.5	3.7	3.7	4.0	4.5	4.8	4.8	4.9	5.2	5.2	5.6	5.5	5.3	6.7
Manufacturing	2.0	2.5	2.7	3.0	3.2	3.2	3.3	3.7	3.9	3.9	4.0	4.2	4.1	4.3	4.3	4.1	4.9
Ordnance	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.2	.2	.2	.2
Food	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Textiles and apparel	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Lumber and furniture	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Paper	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Chemicals	2.0	2.5	2.7	3.0	3.2	3.2	3.3	3.6	3.8	3.8	3.9	4.1	4.0	3.9	3.9	3.7	4.5
Petroleum refining	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Rubber	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Stone, clay, and glass	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Primary metals	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Fabricated metals	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Machinery	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Electrical equipment	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Motor vehicles	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Aircraft	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	.1	.1	.1	.1	.1	.1	.1	.1
Other transportation equipment	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Professional and scientific instruments	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.1	.1	.1	.1
Miscellaneous manufacturing	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Nonmanufacturing	.5	.5	.5	.5	.5	.5	.7	.8	.9	.9	.9	1.0	1.1	1.3	1.2	1.2	1.8
Mining	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Petroleum extraction	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other mining	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Construction	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Transportation, communications, and public utilities	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Railroads	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other transportation	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Telecommunications	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Radio and TV	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Public utilities	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other industries	.5	.5	.5	.5	.5	.5	.7	.8	.9	.9	.9	1.0	1.1	1.3	1.2	1.2	1.8
Miscellaneous business services	.2	.2	.2	.2	.2	.2	.3	.3	.4	.4	.4	.5	.6	.8	.7	.7	1.3
Medical and dental laboratories	.1	.1	.1	.1	.1	.1	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
Engineering and architectural services	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other nonmanufacturing	.2	.2	.2	.2	.2	.2	.2	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3
Government	1.9	2.1	2.1	2.4	2.5	2.5	2.8	3.0	3.1	3.2	3.4	3.6	4.0	4.3	4.6	5.0	5.3
Federal	.4	.6	.5	.7	.7	.7	.9	.9	.9	.9	1.1	1.1	1.4	1.6	1.9	2.1	2.2
State	1.1	1.1	1.2	1.2	1.3	1.3	1.4	1.5	1.6	1.7	1.7	1.8	1.9	2.0	2.0	2.2	2.4
Local	.4	.4	.4	.5	.5	.5	.5	.6	.6	.6	.6	.7	.7	.7	.7	.7	.7
Universities and colleges	4.5	4.5	5.0	5.2	5.6	6.2	7.0	9.1	11.1	12.4	13.6	15.7	18.3	21.2	25.5	28.9	32.4
Nonprofit institutions	.3	.3	.4	.4	.4	.5	.5	.6	.6	.7	.8	1.0	1.3	1.6	1.6	1.7	1.8

(Percent distribution)

Sector	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
All sectors	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Private industry	27.1	30.4	29.9	30.4	30.3	28.7	28.0	26.1	24.5	22.8	21.6	20.4	18.0	17.1	14.8	12.9	14.5
Manufacturing	21.7	25.3	25.2	26.1	26.2	24.8	23.1	21.5	19.9	18.5	17.6	16.5	14.2	13.1	11.6	10.0	10.6
Ordnance	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.6	.5	.5	.4
Food	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Textiles and apparel	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Lumber and furniture	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Paper	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Chemicals	21.7	25.3	25.2	26.1	26.2	24.8	23.1	20.9	19.4	18.0	17.2	16.1	13.9	11.9	10.5	9.0	9.7
Petroleum refining	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Rubber	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Stone, clay, and glass	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	()a	(a)	(a)	(a)
Primary metals	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Fabricated metals	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Machinery	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Electrical equipment	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Motor vehicles	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Aircraft	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.6	.5	.5	.4	.4	.3	.3	.3	.2	.2
Other transportation equipment	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Professional and scientific instruments	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.3	.3	.2	.2
Miscellaneous manufacturing	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Nonmanufacturing	5.4	5.1	4.7	4.3	4.1	3.9	4.9	4.6	4.6	4.3	4.0	3.9	3.8	4.0	3.2	2.9	3.9
Mining	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Petroleum extraction	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other mining	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Construction	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Transportation, communications, and public utilities	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Railroads	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other transportation	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a	(a)	(a)	(a)	(a)	(a)
Telecommunications	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Radio and TV	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Public utilities	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other industries	5.4	5.1	4.7	4.3	4.1	3.9	4.9	4.6	4.6	4.3	4.0	3.9	3.8	4.0	3.2	2.9	3.9
Miscellaneous business services	2.2	2.0	1.9	1.7	1.6	1.6	2.1	1.7	2.0	1.9	1.8	2.0	2.1	2.4	1.9	1.7	2.8
Medical and dental laboratories	1.1	1.0	.9	.9	.8	.8	1.4	1.2	1.0	.9	.9	.8	.7	.6	.5	.5	.4
Engineering and architectural services	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Other nonmanufacturing	2.2	2.0	1.9	1.7	1.6	1.6	1.4	1.7	1.5	1.4	1.3	1.2	1.0	.9	.8	.7	.6
Government	20.7	21.2	19.6	20.9	20.5	19.4	19.6	17.4	15.8	15.2	15.0	14.1	13.9	13.1	12.4	12.2	11.5
Federal	4.3	6.1	4.7	6.1	5.7	5.4	6.3	5.2	4.6	4.3	4.8	4.3	4.9	4.9	5.1	5.1	4.8
State	12.0	11.1	11.2	10.4	10.7	10.1	9.8	8.7	8.2	8.1	7.5	7.1	6.6	6.1	5.4	5.4	5.2
Local	4.3	4.0	3.7	4.3	4.1	3.9	3.5	3.5	3.1	2.8	2.6	2.7	2.4	2.1	1.9	1.7	1.5
Universities and colleges	48.9	45.5	46.7	45.2	45.9	48.1	49.0	52.9	56.6	58.8	59.9	61.6	63.5	64.8	68.5	70.7	70.1
Nonprofit institutions	3.3	3.0	3.7	3.5	3.3	3.9	3.5	3.5	3.1	3.3	3.5	3.9	4.5	4.9	4.3	4.2	3.9

[a] Less than 50 and 0.05 percent. Note: Detail may not add to totals because of rounding. Source: Bureau of Labor Statistics.

APPENDIX B

Methodology of Estimating Science and Engineering Employment

Over the past two decades, statistics on science and engineering employment have been collected by many organizations for a variety of purposes. Differences in occupational definitions, industry coverage, survey techniques, and a variety of other factors, however, have created problems of comparability among the statistics. In addition, employment data for scientists and engineers are not available for some economic sectors for a number of the years.

A main purpose of this study, undertaken by the Bureau of Labor Statistics, was to resolve problems created by the inconsistencies in and the lack of employment data for scientists and engineers and to develop a comprehensive and consistent historical employment series applicable to them. To accomplish this it was necessary, first of all, to establish guidelines for the occupations to be included in the study; to resolve various definitional problems which arose, such as who should be counted as being engaged in R&D work; to establish the types of industry detail to be analyzed and identified; and to establish the reference period applicable to each year's employment estimates (i.e., annual average, early-year, mid-year, etc.). This appendix identifies these guidelines. It also presents the basic sources of data on science and engineering employment and briefly discusses the methodology used to develop the estimates.

Coverage

Scientists and engineers in this report include those who "work as" natural scientists or engineers. This concept, therefore, includes persons without college degrees in science and engineering who were working in engineering and science jobs. It does not include individuals with college degrees in science and engineering who are not working in these fields. Also excluded are social scientists and high school teachers of science subjects, as well as medical scientists who spend the greatest portion of their time providing care to patients. Estimates were developed for total employment and for employment in research and development.

Definitions

The basic definitions used in this time series are those used in the periodic surveys of scientific and technical personnel in private industry and in State and local governments, conducted by the Bureau of Labor Statistics. These surveys cover about four-fifths of all scientists and engineers. Following are the major definitions used in these surveys:

(1) Scientists and engineers are workers who perform at a level requiring education or training equivalent to that acquired through completion of a 4-year college course with a major in a natural scientific or engineering field. (See appendix C for additional definitions of the individual science and engineering occupations.)

(2) R&D scientists and engineers are defined as those who spend the greater portion of their time in basic and applied research in the natural sciences (including medical science) and engineering, and in design and development of prototypes and processes.

(3) The overall employment data include all workers employed as scientists and engineers whether full or part time.

(4) Industry classifications used are those of the Standard Industrial Classification System (SIC), 1967.

Period Covered

This employment series covers the 1950-66 period. Preliminary efforts to develop comparable employment estimates for earlier years were abandoned because the decennial censuses are almost the only sources of earlier data and therefore not augmented or subject to the modifying influences of the other studies that were available for the later period selected. With the difficulties encountered in reconciling the more recent (1950 and 1960) census employment statistics with data from other sources, it was felt that efforts might be more fruitfully concentrated on developing more reliable estimates for the 1950-66 period.

The annual estimates refer to January or "early-in-year" employment, reflecting the same time period as the surveys of scientific and technical personnel in private industry. Relatively few adjustments were necessary to survey data on science and engineering employment in State governments, universities and colleges, and nonprofit organizations, as most data collected were "early-in-year." Adjustments were necessary to survey data on Federal Government and local governments, as October was generally the date of the surveys in these sectors.

Sources of Data

Historically, surveys of science and engineering employment have been made separately for six major sectors of the economy—private industry, Federal Government, State governments, local governments, universities and colleges, and nonprofit organizations.[1] In private industry, surveys of scientific and technical personnel were conducted by the Bureau of Labor Statistics for the years 1952, 1954, annually 1959 through 1964, and 1966. Data on State government employment, also collected by the BLS, are available only for the years 1959, 1962, and 1964. Other non-recurring BLS surveys in this field include a survey of science and engineering employment in local governments for the year 1963 and a pilot survey covering such employment in six States in 1960. Surveys of science and engineering employment in universities and colleges were conducted by the National Science Foundation in 1954, 1958, 1961, and 1965. Scientists and engineers employed by nonprofit organizations were surveyed by the BLS in 1958 and the NSF in 1965. An NSF survey in 1960 of such employment was limited in scope. (For a detailed listing of these surveys see appendix D.)

To augment the data from the various surveys of scientific and engineering employment, other sources of information were used. These included BLS establishment data on total wage and salary worker employment and production worker employment; information from the Decennial Census of Population, 1950 and 1960; Current Population Surveys; information on R&D expenditures from the NSF and Department of Defense; information from the NSF's National Register of Scientific and Technical Personnel on scientists, by field, type of employer, and function; and data on full-time-equivalent R&D employment of scientists and engineers in private industry from NSF reports.

This report also reflects information obtained directly from the BLS programs of occupational outlook and manpower research, which yield valuable industry and occupational data. It is this framework of studies, reports, and analyses which provided the basis for making the many judgments needed to develop the time series covering science and engineering employment.

General Methodology

Total estimates of science and engineering employment were derived by aggregating the separate estimates made for each of the six sectors of the economy for which data on science and engineering employment were available. Within private industry, estimates were derived separately for 31 industry groups

In developing the six sector estimates, data from each employment survey that was conducted during the 1950-66 period were analyzed. Survey data for the various years were analyzed extensively for inconsistencies resulting from changes in survey coverage and definitions. In private industry, for example, it was necessary to account for changes from company to establishment reporting between 1960 and 1961; for State governments, adjustments were made for the different occupational definitions used in the 1962 and 1964 surveys.

Trends in employment for each sector based on the survey data were reviewed and analyzed for consistency. For example, in each of the manufacturing industries, science and engineering employment as reported in the Surveys of Scientific and Technical Personnel in Industry (STP) was analyzed in relation to the trends of employment indicators, such as total employment, nonproduction worker employment, output, and R&D expenditures. When needed, adjustments were made to resolve inconsistencies. Thus, for each industry, the data for years in which a survey was conducted are not necessarily identical to previously published survey data.[2]

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[1] This nonprofit sector includes philanthropic foundations, voluntary health agencies, independent nonprofit institutes, certain Federally Funded Research and Development Centers, professional and technical societies, and science museums, zoological and botanical gardens, and arboretums.

Statistical relationships between the key industry indicators and science and engineering employment for each survey year served as the means of developing initial employment estimates for nonsurvey years. For example, for each industry within the private industry sector, ratios of science and engineering employment to total employment were developed for each survey year. A trend of these ratios was then developed for the entire 1950-66 period. The resulting ratios were applied to estimates of total industry employment in corresponding years to derive "initial" estimates of science and engineering employment. An analysis was then made to see whether the "initial" estimates of science and engineering employment were consistent with other indicators, such as nonproduction worker employment and R&D expenditures.

In using the employment estimates developed in this report, perhaps the most important point to keep in mind is that a considerable amount of judgment was used in making the estimates and, therefore, additional study could possibly result in further refinement and greater reliability of the employment estimates.

Further, the degree of confidence in the estimates varies from sector to sector and from year to year within the same sector. In general, the estimates of all sectors are weaker in the earlier years because of the infrequency of the surveys, the more experimental nature of the earlier surveys, and the smaller amount of related information upon which judgments could be based. The estimates of Federal Government employment, followed by private industry, are felt to be the most reliable, as much more direct and related information was available on science and engineering employment in these sectors. Since these two sectors represent more than 80 percent of all science and engineering employment in the United States, the estimates of total employment of scientists and engineers are believed to be good.

The weakest estimates are for scientists and engineers in the local governments and nonprofit organizations sectors for which comprehensive surveys of science and engineering employment have been conducted very infrequently.

In the statistical tables that present the employment estimates, absolute figures are rounded to the nearest hundred and percentages shown to one decimal place. Since all totals and percentages were calculated on the basis of unrounded figures, they do not always correspond exactly to those indicated by the rounded figures.

Occupational distribution. Employment in each science and engineering occupation was developed on the basis of occupational distributions in individual industries as shown by various surveys. Inconsistencies in the distributions were resolved on the basis of an analysis of the trends that most logically fit the data. Final ratios for each year were applied to the estimates of total science and engineering employment in the industry for the corresponding year to derive employment estimates for individual occupations.

Research and development. Employment estimates of scientists and engineers engaged in research and development were developed similarly to those of total science and engineering employment. First, estimates were made for the years for which survey information was available. After several tests of consistency were conducted between the R&D employment and related industry indicators, particularly data on R&D expenditures, ratios were developed relating R&D employment of scientists and engineers as a proportion of total science and engineering employment. The ratios were then applied to science and engineering employment in corresponding years to derive R&D employment estimates. Another method used to develop estimates of R&D scientist and engineer employment was to develop a trend of R&D expenditures per scientist or engineer engaged in research and development based on survey-year data and then to apply the annual estimates of such expenditures to total R&D expenditures in that sector. (See discussion on universities and colleges later in this appendix.)

Analysis of economy-wide estimates. Estimates of employment for the economy as a whole, made by aggregating estimates of employment by occupation developed for each industry, were analyzed in relation to other economy-wide statistics on trends in science and engineering employment, such as those provided by the decennial censuses and the published and unpublished data from the Current Population Survey. For example, the trends shown in the 1950 and 1960 Decennial Censuses and the annual growth trend shown by Current Population Surveys were compared with those estimates derived by using the methodology described above. Similarly, an analysis was made of estimated employment growth compared with the supply data for these occupations. The estimates of scientists and engineers engaged in research and development in each industry sector were checked for consistency against trends in R&D expenditures per R&D scientist or engineer and the proportion that R&D scientists and engineers made up of total science and engineering employment.

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[2] In private industry, published data also differ because adjustments are made to include those not covered by the STP surveys—the self-employed and those in firms below the cutoff size.

Methodology, by Economic Sector

Private Industry

Employment information on scientists and engineers in private industry was obtained from surveys of employment of Scientific and Technical Personnel in Industry (STP Survey) for the years 1954, 1957, annually 1959 through 1964, and 1966. These studies furnished the basic data on which estimates were developed for 31 two- and three-digit industries as defined by the Standard Industrial Classification System. The 1966 survey was believed to be the most reliable as it had a much larger sample and the statistical techniques were assumed to be better in this, the last of the surveys to be conducted at the time this report was prepared. The data reported in the 1966 survey were used, therefore, as the benchmark for the entire series. The basic problem encountered in developing the series was to devise measures of estimating employment for years for which no survey was conducted and of minimizing the effects of changing survey concepts from year to year.

Survey-year estimates. Employment of scientists and engineers in each industry as reported in the separate surveys was first tabulated and analyzed for consistency with total industry employment, R&D expenditures, and other indicators of industry employment activity. A key measure of consistency was the employment data reported in each survey for the previous year. For example, the 1961 survey collected data for both 1961 and 1960. Previous-year data were particularly helpful in bridging years between which significant changes in survey concepts occurred, or between years for which the levels of employment reported in the surveys were not consistent. For example, the 1960 survey reported 71,400 scientists and engineers employed in the machinery industry. The 1961 survey reported 65,400 but also indicated that employment increased 7.2 percent from 1960. A back-year estimate based on the 1961 survey indicated 60,900 as the 1960 employment. The back-year estimate was generally used as the "initial" survey-year estimate, which was in turn checked out for consistency with available information.

The most important change to affect comparability of industry survey data was the conversion from company to establishment reporting between 1960 and 1961. In the 1960 and earlier surveys, company reporting restricted identification of industry employment to the industrial classification in which the largest proportion of company personnel were employed. The change to establishment reporting in 1961 provided more specific identification of the industry of employment. This is particularly true in large, multi-establishment companies engaged in widely diverse activities.[3] Beginning with 1961, establishments in these large companies were classified separately.

In addition to the adjustments for changes in survey methods and techniques, other adjustments were necessary to assure coverage of all scientists and engineers in the economy. The major adjustment was the inclusion of self-employed scientists and engineers, who are excluded from coverage in the STP surveys. The benchmark estimate of these workers was based upon data in the 1960 census, and trends were established from unpublished data in the Current Population Survey. The large majority of these workers were engineers classified in the engineering and architectural services industry.

Adjustments also were made to account for a small number of scientists and engineers who were estimated to be employed in firms of smaller size than the minimum employment size of firms in the STP surveys. The bulk of these "cutoffs" were in the construction industry. In total, adjustments for cutoffs were made in 10 of the 31 industry groups for which separate estimates were developed in this study. The following are the industries for which cutoff adjustments were made on 1966 employment:

Industry	*Number of employees in smallest size of firm sampled*
Food and kindred products	10
Textile mill products and apparel:	
Textile mill products[4]	50
Apparel[4]	100
Paper and allied products	10

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[3] For illustration of the effect of company versus establishment reporting, see National Science Foundation, *Scientists, Engineers, and Technicians in the 1960's: Requirements and Supply*, NSF 63–34. Washington, D.C. 20402: Supt. of Documents, U.S. Government Printing Office, 1964, appendix table G–1.

Rubber and miscellaneous plastic products	**10**
Stone, clay, glass, and concrete products:	
Hydraulic cement[4]	**10**
Stone, clay, and glass products[4]	**4**
Lumber and furniture	**50**
Contract construction	**4**
Miscellaneous manufacturing:	
Tobacco manufacturers[4]	**50**
Printing, publishing, and allied industries[4]	**100**
Miscellaneous manufacturing industries[4]	**10**
Mining, except petroleum	**10**
Other transportation services:	
Local passenger transportation[4]	**100**
Trucking[4]	**10**
Water transportation[4]	**10**
Air transportation[4]	**100**
Pipeline transportation[4]	**50**

Exclusion of industry segments in early surveys also produced problems of comparability in survey data. For example, in the 1957 surveys the minimum employment size of firms providing miscellaneous business services was 100 employees; in 1959, 50. The change in employment size for cutoffs in construction firms from 10 in the 1964 survey to 4 in the 1966 survey also had a pronounced effect on reported employment.

Many sources of industry information were used in appraising the consistency of year-to-year variations in survey-year employment as shown by the initial estimates, especially information from reports of industry activity and employment prepared by government agencies. Industry occupational data, such as those periodically reported by regulatory agencies, and information collected during the course of research for the Bureau's occupational outlook program also were used to develop the employment estimates.

In analyzing survey-year science and engineering employment by industry, extensive analysis was made of the relationship of STP survey data with BLS data on employment of wage and salary workers. In each industry, ratios of science and engineering employment to total employment and to nonproduction worker employment were developed by relating science and engineering employment as reported in the STP surveys to wage and salary worker employment and to nonproduction worker employment as reported by BLS establishment employment statistics based on payroll data. Consistency of trends in these latter ratios were considered to be of the highest importance, and many of the judgment estimates resulted from elimination of computed ratios that were inconsistent.

Improvements in STP survey techniques since 1962 have significantly reduced the inconsistency of survey data. Few "judgment" changes were made to the reported data in the 1963 and 1964 surveys and almost none to the 1966 survey data. The 1962 and 1961 survey data that were revised based on new survey estimating procedures also were consistent with other data and only minor adjustments were made.[5] Thus, data in the published 1962 and 1961 surveys were not used extensively. They were used primarily to adjust year-to-year changes. For example, information in the 1961 survey on 1961 and 1960 employment was used primarily to develop the percent increase in employment between 1960 and 1961. By relating this change to the 1961 revised survey data, the initial 1960 estimate was developed.

Non-survey year estimates. The initial estimates of science and engineering employment for non-STP-survey years relied heavily on the use of ratios of science and engineering employment to total industry employment that were developed based upon trends in these ratios in the survey years. The initial employment estimates obtained by applying estimated ratios to appropriate BLS wage and salary worker employment were analyzed in relation to other industry indicators such as production levels, product mix, capital expenditures, technology, and R&D expenditures. This analysis provided a basis for necessary adjustments to the initial estimates.

Occupational estimates. In developing occupational estimates, employment in each occupation by industry was computed as a percent of the industry's total science and engineering employment as was reported in each survey. Changes in the proportions from year to year were examined for consistency and reasonableness. Extreme variations were examined for possible industry and occupational classification differences. For example, survey data for the iron and steel industry showed that employment of metallurgists (included in "other physical scientists") and engineers moved radically in opposite directions from year to year. Investigation indicated that the differences shown in these occupations from survey to survey resulted from classification problems rather than from actual employment changes.

Adjusted survey-year proportions in each occupation were used to develop trends from which initial estimates were made for non-survey years. For all years, the percent that each occupation made up of total science and engineering employment in each industry was applied to estimates of total science and engineering employment. The resulting employment levels were checked for consistency with any available data, such as 1950 and 1960 census of population information or the special industry studies.

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[4] A separate historical employment series was not developed for this industry.

[5] The revised 1961 and 1962 survey data will be published by the BLS along with the reports on the 1963, 1964, and 1966 surveys.

R&D estimates. To develop estimates of scientists and engineers engaged in research and development, the proportions that R&D scientists and engineers made up of all scientists and engineers were derived by industry from each STP survey. These data were considered in conjunction with other data, such as R&D expenditures by industry and statistics on full-time-equivalent employment of scientists and engineers collected by the Bureau of the Census for the National Science Foundation. After adjustments in the survey-year ratios were made for irregularities, trends were developed for the entire 1950-66 period, which provided proportions of total science and engineering employment in research and development for the non-survey years. The R&D employment series was developed by applying these ratios to estimates of total scientist and engineer employment.

STP survey data for individual science and engineering occupations employed in research and development were found to be so inconsistent from year to year that occupational series were not developed.

Federal Government

Employment estimates developed for the Federal Government sector were based primarily on Civil Service Commission surveys of Federal Government employment for the years 1951, 1954, annually 1957 through 1962, 1964, and 1966. The basic problem encountered was the lack of comparability of occupational titles used in the time series with the many job titles in the CSC code. To develop comparable occupational categories, Federal Government occupational titles were analyzed in detail by evaluating written descriptions and by discussing problem occupations with CSC officials and in some cases with supervisors of workers in the occupations in question.

The following table shows the CSC occupational codes and titles (as of December 1966) that were included in the occupational employment estimates in this report.

Occupational classification for employment series	*Civil Service Commission code and occupational title*	
ENGINEERS		
	GS–800	Valuation engineering[1]
	GS–801	General engineering
	GS–803	Safety engineering
	GS–804	Fire prevention engineering
	GS–806	Materials engineering
	GS–808	Architecture[2]
	GS–810	Civil engineering
	GS–819	Sanitary engineering
	GS–830	Mechanical engineering
	GS–840	Nuclear engineering
	GS–850	Electrical engineering
	GS–855	Electronic engineering
	GS–861	Aerospace engineering
	GS–870	Marine engineering
	GS–871	Naval architecture
	GS–880	Mining engineering
	GS–881	Petroleum engineering[3]
	GS–890	Agricultural engineering
	GS–892	Ceramic engineering
	GS–893	Chemical engineering
	GS–894	Welding engineering
	GS–896	Industrial engineering
	GS–1301	General physical science[4]

Data for the following engineering series were used prior to their discontinuation. Personnel in these series were reclassified into other engineering series. For example, structural engineers were classified as civil engineers in December 1964.

GS–805	Maintenance engineering. Series discontinued, December 1964.
GS–811	Construction engineering. Series discontinued, December 1964.
GS–812	Structural engineering. Series discontinued, December 1964.
GS–813	Hydraulic engineering. Series discontinued, December 1964.
GS–820	Highway engineering. Series discontinued, December 1964.
GS–824	Bridge engineering. Series discontinued, December 1964.
GS–831	Automotive engineering. Series number changed to GS–832, January 1958.
GS–832	Automotive engineering. Series discontinued, February 1965.
GS–834	Internal combustion power plant engineering. Series discontinued, August 1961.
GS–862	Airways engineering. Series discontinued, December 1964.

MATHEMATICIANS

GS–1520	Mathematics
GS–1529	Mathematical statistician[5]

CHEMISTS

GS–1301	General physical science[4]
GS–1320	Chemistry

GEOLOGISTS AND GEOPHYSICISTS

GS–1301	General physical science[4]
GS–1313	Geophysics
GS–1350	Geology
GS–1372	Geodesy

PHYSICISTS

GS–1301	General physical science[4]
GS–1306	Health physics
GS–1310	Physics

OTHER PHYSICAL SCIENTISTS

GS–015	Operations research
GS–1301	General physical science[4]
GS–1315	Hydrology
GS–1321	Metallurgy
GS–1330	Astronomy and space science[6]
GS–1340	Meteorology
GS–1360	Oceanography[7]
GS–1370	Cartography
GS–1373	Cadastral survey
GS–1380	Forest products technology
GS–1382	Food technology
GS–1384	Textile technology

Data for GS-1390, Technology, were used prior to the series discontinuation in June 1966. Personnel were reclassified into the physical sciences series.

AGRICULTURAL SCIENTISTS

GS–434	Plant pathology
GS–437	Horticulture
GS–452	Park naturalist
GS–454	Range conservation
GS–457	Soil conservation
GS–460	Forestry
GS–470	Soil science
GS–471	Agronomy
GS–487	Husbandry
GS–701	Veterinary medical science[8]

Data for GS-450, General Agriculture Administration, and GS-451, General Agriculture, were used prior to the series discontinuation in April 1967. An adjustment was made to data reported for GS-451 prior to August 1959, at which time the U.S. Civil Service Commission created GS-475, Farm Management Loan, from a portion of GS-451.

BIOLOGICAL SCIENTISTS

GS–401	Biology
GS–403	Microbiology
GS–405	Pharmacology
GS–410	Zoology
GS–411	Systematic zoology
GS–412	Parasitology
GS–413	Physiology
GS–414	Entomology
GS–415	Nematology
GS–430	Botany
GS–435	Plant physiology
GS–436	Plant quarantine and pest control
GS–440	Genetics
GS–480	General fish and wildlife administration
GS–482	Fishery biology
GS–485	Wildlife refuge management
GS–486	Wildlife biology

Data for the following series were used prior to their discontinuation. Personnel in these series were reclassified into other biological sciences series.

GS–420	Bacteriology. Series discontinued, December 1962.
GS–431	Mycology. Series discontinued, December 1962.
GS–433	Plant taxonomy. Series discontinued, April 1966.
GS–484	Animal control biology. Series discontinued, February 1966.
GS–494	Microanalysis. Series discontinued, December 1962.

MEDICAL SCIENTISTS[8]

GS–602	Medical officer
GS–630	Dietitian
GS–660	Pharmacist
GS–662	Optometrist
GS–680	Dental officer
GS–685	Public health program specialist[9]
GS–690	Industrial hygiene
GS–695	Food and drug officer

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[1] Series coded GS–897 until June 1965.

[2] Series established in August 1962; replaced former GS–1040, Architecture.

[3] Series title changes from Petroleum Production and Natural-Gas Engineering in June 1966.

[4] This series was distributed into engineering and physical science occupational groups based upon the proportion that each occupation was of combined engineering and physical science employment before the addition. The bulk of these workers are employed at NASA.

[5] Series established in February 1961; personnel formerly classified in GS–1530, Statistician.

[6] Series title changed from Astronomy in August 1961.

[7] Series title changed from Nautical Science in August 1963.

[8] Only those persons engaged in R&D activities were counted.

[9] Series title changed from Public Health Administration in October 1963.

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Most CSC surveys were conducted as of October 31. Therefore, adjustments were made, based on the relationship of science and engineering employment to total Federal employment, to make the data conform to the January dateline of the other sectors. Once satisfactory estimates were derived for the survey years, estimates for the non-survey years were obtained by applying rates of change to the survey-year estimates based on changes in total Federal Government employment.

Estimates of employment of scientists and engineers engaged in research and development for the 1958-62 period were based on CSC survey data as reported in those survey years. Survey data on R&D employment were not collected for other years. (CSC is currently conducting a study that will provide R&D employment in 1967.) Estimates of employment for years in which data were not collected (prior to 1958) were developed by first establishing trends in Federal R&D expenditures per R&D scientist or engineer based on survey-year data and then by relating these trends to Federal Government expenditures on research and development.

State Government

Estimates of employment of scientists and engineers in State governments were based primarily on information in the BLS surveys of scientists and engineers employed in this sector in 1959, 1962, and 1964.[6] After the data from these surveys were adjusted for comparability of occupational classifications, total science and engineering employment and employment by occupation were estimated for the intervening years through an analysis of the relation of science and engineering employment to total State government employment (less State educational employment)[7] as reported by the BLS. Other data used to analyze engineering employment were expenditures for highway programs and total highway department employment, as about 80 percent of the scientists and engineers in State governments were employed in highway departments.

For estimates of employment of engineers in State governments for 1950 through 1956 use also was made of two Bureau of Public Roads inventories of State highway engineering manpower, 1956 and 1960, which included data for the years 1950, 1954, 1955, and 1960. *Census of Government* data provided highway employment and expenditures information for 1950 and 1952 through 1966.

Estimates of employment of scientists and engineers in R&D activities were derived by an analysis of the ratio of scientists and engineers in research and development to total scientists and engineers in the STP survey years. These ratios were used to develop ratios for non-survey years which were applied to total science and engineering employment estimates.

Local Governments

Estimates of employment in this sector are weaker than those in other sectors because of the dependence on only two surveys of science and engineering employment, one of which was only a pilot survey of employment in six States as of January 1960. Data from the other survey, which reported employment as of October 1963, were adjusted to the desired January levels based on an analysis of the change in total local government employment.

Initial estimates of science and engineering employment for the 1950-66 period were developed by relating the growth of total local government employment (minus education)[8] over this period to the 1963 science and engineering employment. The initial estimates were adjusted to reflect the relative growth of cities with populations of 50,000 or more to those with less than 50,000, as the former generally have a higher proportion of scientists and engineers.

Information on local government expenditures by function derived from *Census of Government* data provided the means of estimating changes in the occupational composition of scientists and engineers for the 1950-66 period. In the lack of any substantive information on R&D activities in local governments, estimates of employment of scientists and engineers engaged in research and development in this sector were based on the proportion that scientists and engineers in R&D activities made up of total scientists and engineers in State governments.

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[6] National Science Foundation, *Employment of Scientific and Technical Personnel in State Government Agencies. Report on a 1959 Survey,* NSF 61-17, 1961; and U.S. Department of Labor, Bureau of Labor Statistics, *Employment of Scientific and Technical Personnel in State Government Agencies, 1962,* Bulletin No. 1412, 1964, and *Review of Occupational Employment Statistics Employment of Scientific, Professional, and Technical Personnel in State Governments, January 1964,* Bulletin No. 1557, 1967.

[7] Educational employment was excluded from the series because employment in universities and colleges, which represents the major portion of State educational employment, is included in the coverage of surveys of universities and colleges conducted by the National Science Foundation.

[8] Education employment was excluded from the local government employment series because those employees in the local school system with science backgrounds, such as instructors in physics or mathematics, are regarded as teachers rather than scientists. Local government employment, minus education, for the years 1955–66 was available from BLS establishment data, and estimates for the years 1950–54 were made using the relationship of employment minus education to total employment for the later period.

Universities and Colleges

The published NSF studies of scientists and engineers employed by universities and colleges[9] in 1954, 1958, 1961, and 1965 provided the basic employment information. Substantial adjustments to these data were required to make the information comparable among the surveys. For example, the 1954 survey provided information on faculty by occupation but omitted information on non-faculty and research center employment by occupation; the 1958 survey provided data on faculty and non-faculty but omitted information on scientists by occupation.

The historical employment estimates of scientists and engineers over the 1950-66 period were developed separately for research and development and for teaching. All scientists and engineers engaged in other activities, such as administration, were included with teachers, as they represented a small portion of the total.

Teacher estimates were based primarily on the relationship of science and engineering graduates to science and engineering teachers in the survey years. It was felt that this relationship would provide the best measure for judging employment changes among science and engineering teachers. Estimates based on the relationship of enrollments to teachers would have been a better measure, but historical data on enrollments by field of study are not available.

Problems arose in analyzing data for the early 1950's. By applying the graduate-to-teacher ratio which was extrapolated for the entire 1950-66 period based on the data from three surveys (not including 1954), the number of teachers calculated for the early 1950's was much larger than appears probable. This reflected, of course, the large number of graduates in the early 1950's, which resulted from World War II veterans being in those classes. It was assumed, therefore, that the science and engineering graduate-to-teacher ratio was much higher in the earlier years than in the mid-1950's. This was consistent with Office of Education data for all fields of study combined.

R&D scientist and engineer employment was based primarily on the relationship of R&D expenditures to R&D scientists and engineers. A trend was established from survey-year data of R&D dollar expenditures per R&D scientist or engineer employed. These ratios were plotted over time for the 1950-66 period and then applied to data on R&D dollars expended for research in universities and colleges.

The total employment estimate derived by aggregating the teaching and R&D scientist and engineer totals for each year were checked for consistency. For example, a check was made to assure a logical relationship in the trend of employment in teaching and in research and development.

The occupational distribution of total science and engineering employment was based on an analysis of the 1954, 1961, and 1965 distributions, from which trends were developed for the entire 1950-66 period. The initial estimates were checked and revised to assure consistency with degree data by field of study.

In deriving the total employment estimates for this sector, it was assumed that a large majority of all scientists and engineers employed part time by universities and colleges have their primary employment in some other sector. Since no estimates were available of the small number of part-time personnel who are not employed in some other sector, all part-time scientists and engineers were excluded. The total annual estimates are not believed to be significantly effected by their exclusion. However, in addition to the full-time scientists and engineers, salaried graduate students employed by universities and colleges in the covered occupations were included in the total annual estimates (about 49,000 in the 1965 survey).

Nonprofit Institutions

Estimates in this sector were based primarily on information from the 1958 and the 1965 NSF surveys of science and engineering employment in nonprofit organizations. Substantial adjustment was necessary to make the data from the 1958 survey consistent with the other industry sectors, as the occupational distribution was different and the data were on a full-time-equivalent basis. Since survey data indicated a high level of R&D personnel to total science and engineering employment in nonprofit organizations, this area of employment was developed first.

A series of R&D expenditures (in constant dollars) was derived for the entire 1950-66 period, using NSF and Department of Defense data. The 1958 and 1965 estimates of expenditures were then related to survey employment data in the respective years to obtain estimates of R&D expenditures per R&D scientist or engineer in 1958 and 1965. Despite the weakness of a trend based on two points in time, a trend was developed which was based heavily on an analysis of the changes in R&D expenditures per scientist or engineer in other industry sectors over the 1950-66 period. This series, in turn, was applied to the estimates of total expenditures for R&D activities by nonprofit organizations in the non-survey years to obtain an employment series for scientists and engineers engaged in research and development. The estimate of total employment of scientists and engineers over the 1950-66 period was based on the relationship of R&D employment of scientists and engineers to total employment in 1958 and 1965. The occupational distribution over the period also was based on the 1958 and 1965 distributions.

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[9] Including Federally Funded Research and Development Centers operated by universities and colleges.

Analysis of Aggregate Science and Engineering Employment

The estimates of science and engineering employment in all sectors of the economy combined were analyzed on an aggregate basis to assure consistency of the totals with employment indicators on an aggregate basis. For example, an analysis was made between trends in total science and engineering employment and trends in total employment; total R&D expenditures; and total professional, technical, and kindred worker employment.

An analysis also was made of the employment growth over the 1950-66 period with the growth that would be indicated by the supply from college graduates, immigrants, workers returning to the labor force, persons in other occupations transferring to science and engineering jobs, and occupational losses that would result from deaths, retirements, and transfers to other occupations.

The 96-percent growth of engineers from 1950 to 1960 indicated in the employment series developed in this report is more rapid than the 67-percent increase shown by Census data.[10] The totals in the employment series were about 75 percent and 95 percent of the Census totals in 1950 and 1960 respectively. Considering the differences in the nature of reporting that form the basis for the two bodies of data, the disparities between these reports are not unreasonable. The employment series estimates are based on reports by employers; the Census data, from households. That differences between these two reporting techniques do provide somewhat different results is indicated by the post-censal report, *The Employer Record Check.*[11] The tabulations in this study, covering major occupational groups, show higher proportions reported in professional and technical, sales, and craftsmen categories and lower proportions in managerial, service, and laborer classifications in the household count than in data reported by employers.

Overstatement of engineering employment in the household survey (compared to what may be expected from employers) is indicated also by a special tabulation of 1950 Census data provided to BLS. This table, which cross-classifies engineering employment by age and years of school attended, shows that about 4.5 percent of those reported as engineers were too young, or had insufficient schooling in relation to age, to qualify for the work normally performed by engineers.

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[10] Census data were modified to omit metallurgists and include engineering professors and instructors to make the two series comparable.

[11] Department of Commerce, Bureau of the Census. *Evaluation and Research Program of the U.S. Census of Population and Housing,* Series BR60 No. 6. Washington, D.C. 20402: Supt. of Documents, U.S. Government Printing Office, 1965.

APPENDIX C

Definitions of Scientists and Engineers

The scientific and engineering occupational definitions used in this report are the same as those specified in the latest published report on science and engineering employment in private industry, *Employment of Scientific and Technical Personnel in Industry, 1962,* as well as in the 1963, 1964, and 1965 surveys. The occupational definitions provided by the questionnaire for this survey were furnished as a guide to establishment personnel from whom this information was solicited.

Scientists represent all persons actually engaged in scientific work at a level which requires knowledge of physical, life, engineering, or mathematical sciences equivalent at least to that acquired through completion of a 4-year college course with a major in one of these fields, regardless of whether they hold a college degree in the field. Included are those persons in research-development, production, management, technical service, technical sales, and other positions which require them to use the indicated level of knowledge in their work. Excluded are persons trained in science but currently employed in positions not requiring the use of such training. Excluded also are psychologists and social scientists.

Engineers represent all persons actually engaged in chemical, civil, electrical, mechanical, metallurgical, and all other types of engineering work at a level which requires knowledge of engineering, physical, life, or mathematical sciences equivalent at least to that acquired through completion of a 4-year college course with a major in one of these fields, regardless of whether they hold a college degree in the field. Included are persons in research-development, production, management, technical service, technical sales, and other positions which require them to use the indicated level of knowledge in their work. Included also are architectural engineers, but not architects. Also excluded are persons trained in engineering but currently employed in positions not requiring the use of such training.

Mathematicians represent only those persons whose positions require knowledge of mathematics equivalent at least to that acquired through 4-year college courses with a major in mathematics and who spend the greatest proportion of their time in development or application of mathematical techniques. Included are actuaries and mathematical analysts. Included also are statisticians and programmers, but only if they specialize in mathematical techniques. Accountants are excluded.

Medical scientists represent only those physicians, dentists, public health specialists, pharmacists, and members of other scientific professions concerned with the understanding of human diseases and improvement of human health who spend the greatest portion of their time in clinical investigation and other research, production, technical writing, and related activities. Excluded are persons who spend the greatest portion of their time in providing care to patients, dispensing drugs or services, diagnosis, etc. Persons working as pathologists, microbiologists, pharmacologists, etc. are excluded from the figures on medical scientists and included in the figures on biological scientists.

Agricultural scientists represent all persons who spend the greatest portion of their time in understanding and improving agricultural productivity, such as those working in agronomy, animal husbandry, forestry, horticulture, range management, soil culture, and veterinary science. Excluded are veterinarians who are primarily engaged in providing care to animals.

Biological scientists represent all persons who work in sciences which deal with life processes, other than those classified as agricultural and medical sciences. Included are pathologists, microbiologists, pharmacologists, bacteriologists, toxicologists, botanists, zoologists, and kindred specialists.

APPENDIX D

Basic Sources of Employment Data on Scientists and Engineers, 1950-1966

This bibliography presents a selected list of reports on surveys of employment of scientists and engineers conducted over the 1950–66 period. The items are listed by the sector for which data were collected.

Private Industry

National Science Foundation. *Science and Engineering in American Industry, Final Report on a 1953–1954 Survey.* NSF 56–16, 1956.

———. *Science and Engineering in American Industry, Report on a 1956 Survey.* NSF 59–50, 1960.

———. *Scientific and Technical Personnel in American Industry, Report on a 1959 Survey.* NSF 60–62, 1960.

———. *Scientific and Technical Personnel in Industry, 1960.* NSF 61–75, 1961.

———. *Scientific and Technical Personnel in Industry, 1961.* NSF 63–32, 1964.

U.S. Department of Labor, Bureau of Labor Statistics. *Scientific Research and Development in American Industry.* Bull. No. 1148, 1953.

———. *Employment of Scientific and Technical Personnel in Industry,* 1962. Bull. No. 1418, June 1964.

———. *Scientific and Technical Personnel in Industry, 1961–66.* Bull. No. 1609. In press.

Federal Government

National Science Foundation. *Scientists and Engineers in the Federal Government, October 1958.* NSF 61–43, 1961.

———. *Scientific and Technical Personnel in the Federal Government, 1959 and 1960.* NSF 62–26, 1962.

———. *Scientific and Technical Personnel in the Federal Government, 1961 and 1962.* NSF 65–4, 1965.

———. *Scientific and Technical Personnel in the Federal Government,* 1964. NSF 67–21, 1967.

———. *Reviews of Data on Science Resources,* No. 14, "Scientific and Technical Personnel in the Federal Government, 1966" NSF 68–16, April 1968.

U.S. Civil Service Commission. *Occupations of Federal White-Collar Workers, Showing Sex, Grades, and Average Salaries of Employees on August 31, 1954.* Pamphlet 56, June 1955.

———. *Occupations of Federal White-Collar Workers, February 28, 1957.* Pamphlet 56–1, June 1958.

———. *Occupations of Federal White-Collar Workers, October 31, 1958.* Pamphlet 56–2, April 1960.

———. *Occupations of Federal White-Collar Workers, October 31, 1959.* Pamphlet 56–3, June 1961.

———. *Occupations of Federal White-Collar Workers, October 31, 1960.* Pamphlet 56–4, February 1963.

———. Trend of Federal civilian employment in scientific, engineering, and related supporting occupations, 1938 to 1961. Unpublished summary, 1965.

State Governments

National Science Foundation. *Employment of Scientific and Technical Personnel in State Government Agencies. Report on a 1959 Survey.* NSF 61–17, 1961.

U.S. Department of Labor, Bureau of Labor Statistics. *Employment of Scientific and Technical Personnel in State Government Agencies, 1962.* Bull. No. 1412, June 1964.

———. *Employment of Scientific, Professional and Technical Personnel in State Governments, January 1964.* Bull. No. 1557, 1967.

Local Governments

U.S. Department of Labor, Bureau of Labor Statistics. Survey of scientific and technical personnel employed by local government units, October 1963. Unpublished preliminary summary for internal use only, 1966.

Universities and Colleges

National Science Foundation. *Scientific Research and Development in Colleges and Universities—Expenditures and Manpower, 1953–54.* NSF 59–10, 1959.

———. *Scientific Research and Development in Colleges and Universities—Expenditures and Manpower, 1958.* NSF 62–44, 1963.

———. *Scientists and Engineers in Colleges and Universities, 1961.* NSF 65–8, 1965.

———. *Reviews of Data on Science Resources,* No. 9, "Resources for Scientific Activities at Universities and Colleges, 1964." NSF 66–27, August 1966.

———. *Science and Engineering Staff in Universities and Colleges, 1965–75.* NSF 67–11, 1967.

Nonprofit Organizations

National Science Foundation. *Scientific Research and Development of Nonprofit Organizations—Expenditures and Manpower, 1957.* NSF 61–37, 1961.

———. *Research and Other Activities of Private Foundations, 1960.* NSF 64–14, 1964.

———. *Scientific Activities of Nonprofit Organizations, 1964.* NSF 67–17, 1967.

Publications listed above can in most cases be purchased from the Supt. of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

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